

# **APPENDIX E ALTERNATIVE COST SUMMARIES**

MA	]					
PROJECT :	Boulder Creek MDP - Reach 1					
DRAINAGEWAY :	Boulder Creek					
REACH :	1A					-
JURISDICTION :	City of Longmont					
REACH ID:	BCM-Reach1A	Jeremy Deischer		DATE :	2015-04-22	
	1		r	1	T.	1
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Estimated New Stream	<user defined="" items<="" td=""><td>1400</td><td>L.F.</td><td>\$133.00</td><td>\$186,200.00</td><td></td></user>	1400	L.F.	\$133.00	\$186,200.00	
ERC Estimated Riparian Restoration	<user defined="" items<="" td=""><td>6</td><td>AC</td><td>\$35,000.00</td><td>\$224,977.00</td><td>100 ft. each side of river</td></user>	6	AC	\$35,000.00	\$224,977.00	100 ft. each side of river
	Master Plan Capital Improv	ement Cost Su	mmarv			
Capital Improvement Costs			,			
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$411,177.00	
Subtotal Capital Improvement Costs					\$411,177.00	
Additional Capital Improvement Co	sts					
Dewatering		\$4,111.77	L.S.		\$4,112.00	
Mobilization		5%			\$20,559.00	
Traffic Control		\$10,279.43	L.S.		\$10,279.00	
Utility Coordination/Relocation		\$10,279.43	L.S.		\$10,279.00	
Stormwater Management/Erosion Control		5%			\$20,559.00	
Subtotal Additional Capital Improvement Co	sts				\$65,788.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)		1		1	
Engineering		15%			\$71,545.00	
Legal/Administrative		5%			\$23,848.00	
Contract Admin/Construction Management		10%			\$47,697.00	
Contingency		25%			\$119,241.00	
Subtotal Other Costs		\$262,331.00				
Total Capital Improvement Cost	ts	\$739,296.00				
Maste	r Plan Operation and Maintenanc	e Cost Summar	y			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	1400	L.F.	\$2.00	\$560.00	
Total Annual Operation and Ma	intenance Cost				\$560.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$19,600.00				

MAS							
PROJECT :	Boulder Creek MDP - Reach 1						
DRAINAGEWAY :	Boulder Creek					-	
REACH :	18					-	
JURISDICTION :	City of Longmont			1			
REACH ID:	BCM-Reach1B						
					TOTAL		
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS	
Special Items (User Defined)							
Riverside Spillway	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$225,000.00</td><td>\$225,000.00</td><td></td></user>	1	L.S.	\$225,000.00	\$225,000.00		
						lí	
	Master Plan Capital Impr	ovement Cost Su	mmary				
Capital Improvement Costs							
Pipe Cuiverts and Storm Drains					\$0.00		
Concrete Box Culverts					\$0.00		
Hydraulic Structures					\$0.00		
Channel Improvements					\$0.00		
Detention/Water Quality Facilities					\$0.00		
Removals		\$0.00					
Landscaping and Maintenance Improvements		\$0.00					
Special Items (User Defined)		\$225,000.00					
Subtotal Capital Improvement Costs					\$225,000.00		
Additional Capital Improvement Co	sts						
Dewatering		\$2,250.00	L.S.		\$2,250.00		
Mobilization		5%			\$11,250.00		
Traffic Control		\$5,625.00	L.S.		\$5,625.00		
Utility Coordination/Relocation		\$5,625.00	L.S.		\$5,625.00		
Stormwater Management/Erosion Control		5%			\$11,250.00		
Subtotal Additional Capital Improvement Cos	sts				\$36.000.00		
Land Acquisition Costs							
ROW/Easements					\$0.00		
Subtotal Land Acquisition Costs					\$0.00		
Other Costs (percentage of Capita	Improvement Costs)						
Engineering		15%			\$39,150,00		
Legal/Administrative		5%			\$13,050,00		
Contract Admin/Construction Management		10%			\$26,100,00		
Contingency		25%			\$65,250,00		
Subtotal Other Costs		2070			\$143,550.00		
Total Capital Improvement Costs							
			n				
Maste	Master Plan Operation and Maintenance Cost Summary						
Description	•	Quantity	Unit	Unit Cost	Total Annual Cost		
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00		
Total Annual Operation and Ma	intenance Cost				\$122.00		
Effective Interest Rate					1.50%		
Total Operation and Maintenance Costs Over 50 Years							

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MA						
PROJECT :	Boulder Creek MDP - Reach 2					
DRAINAGEWAY :	Boulder Creek					
REACH :	2A					
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach2A	Jeremy Deischer		DATE :	2015-04-22	
	1					
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
180 ft. span bridge at CO Rd 20.5	<user defined="" items<="" td=""><td>5400</td><td>SF</td><td>\$250.00</td><td>\$1,350,000.00</td><td>30 ft width bridge</td></user>	5400	SF	\$250.00	\$1,350,000.00	30 ft width bridge
Removal of old bridge	<user defined="" items<="" td=""><td>3900</td><td>SF</td><td>\$50.00</td><td>\$195,000.00</td><td>130 ft x 30 ft</td></user>	3900	SF	\$50.00	\$195,000.00	130 ft x 30 ft
	Master Plan Capital Improv	ement Cost Su	nmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals		\$0.00				
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,545,000.00	
Subtotal Capital Improvement Costs					\$1,545,000.00	
Additional Capital Improvement Co	sts					
Dewatering		\$15,450.00	L.S.		\$15,450.00	
Mobilization		5%			\$77,250.00	
Traffic Control		\$38,625.00	L.S.		\$38,625.00	
Utility Coordination/Relocation		\$38,625.00	L.S.		\$38,625.00	
Stormwater Management/Erosion Control		5%			\$77,250.00	
Subtotal Additional Capital Improvement Co	sts				\$247,200.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	i Improvement Costsj	450/			£000.000.00	
Engineering		15%			\$268,830.00	
Cegar/Administrative		5%			\$09,010.00	
Contract Admin/Construction Management		10%			\$179,220.00	
Subtotal Other Costs		23%			\$985 710 00	
Total Capital Improvement Cost	ha h	\$2 777 010 00				
Total Capital improvement Cos	15				\$2,111,910.00	
Maste	r Plan Operation and Maintenan	o Cost Summer	v			
Maste	Fian Operation and Maintenand	e cost summar	<b>y</b>	Unit Oraci	Total Annual C	
Channel Maintenance (e.g. sediment & debris r	amount aracian trae & wood remount atc.)	Quantity	Unit	S2 00	s12.00	
Total Appual Operation and Ma	intenence Cost	30	с.г.	φ2.00	\$12.00	
Effective Interest Rate	intenance Cost				<b>\$12.00</b>	
Total Operation and Meintenen	an Costa Over El Venro				\$420.00	
Total Operation and Maintenan	ce cosis over so rears	\$420.00				

MAS						
PROJECT :	Boulder Creek MDP - Reach 2					
DRAINAGEWAY :	Boulder Creek					
REACH :	2B					
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach2B	Jeremy Deischer		DATE :	2015-04-22	
P						
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Modify Diversion for Aquatic Passage	<user defined="" items<="" td=""><td>1</td><td>LS</td><td>\$205,000,00</td><td>\$205.000.00</td><td></td></user>	1	LS	\$205,000,00	\$205.000.00	
				+=======	+========	
	Master Plan Capital Impro	vement Cost Su	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Eacilities					\$0.00	
Deteritori Water Quality Lacintes					\$0.00	
Londocoping and Maintenance Improvements					\$0.00	
Earluscaping and Maintenance Improvements Special Items (Leer Defined)					\$205,000,00	
Subtetal Capital Improvement Capita					\$205,000.00	
Additional Capital Improvement Costs	oto				\$205,000.00	
Additional Capital Improvement Co	515	\$2.050.00	1.6		\$2.050.00	
MehiEvelop		\$2,030.00	L.O.		\$2,030.00	
Traffic Central		5% \$5.125.00	1.6		\$10,230.00	
Hallic Control		\$5,125.00	L.3.		\$5,125.00	
Control Management/Exercise Control		40,120.00 F9/	L.O.		\$3,125.00	
Stornwater Management/Erosion Control		3%			\$10,230.00	
Subtotal Additional Capital Improvement Cos	515				\$32,800.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs			_		\$U.00	
Other Costs (percentage of Capita	I Improvement Costs)	450/	1		805.070.00	
Engineering		15%			\$35,670.00	
Legar Administrative		5%			\$11,890.00	
Contract Admin/Construction Management		10%			\$23,780.00	
Contingency		23%			\$59,450.00	
Subtral Other Costs \$						
Total Capital Improvement Costs \$						
Maste	r Plan Operation and Maintenan	ce Cost Summar	ry	1	I	
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Ma	intenance Cost				\$122.00	
Effective Interest Rate					1.50%	
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years	\$4,270.00				

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MASTER PLAN COST ESTIMAT										
					1					
PROJECT : Boulder Creek MDP - Reach 2										
DRAINAGEWAY : Boulder Creek										
REACH : 2C										
JURISDICTION : Weld County										
REACH ID: BCM-Reach2C	Jeremy Deischer		DATE :	2015-04-22						
					1 					
				TOTAL						
DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS					
Special Items (User Defined)										
Modify Ditch for Aquatic & Habitat Passage	1	LS	\$250,000,00	\$250,000,00						
, , , , , , , , , , , , , , , , , , , ,				+=======						
Master Plan Capital Impro	vement Cost Su	mmarv								
Capital Improvement Costs										
Pipe Culverts and Storm Drains				\$0.00						
Concrete Box Culverts				\$0.00						
Hydraulic Structures				\$0.00						
Channel Improvements				\$0.00						
Detention/Water Quality Facilities				\$0.00						
Removals				\$0.00						
Landscaping and Maintenance Improvements				\$0.00						
Special Items (User Defined)				\$250,000,00						
Subtotal Capital Improvement Costs				\$250,000,00						
Additional Capital Improvement Costs										
Dewatering	\$2,500,00	LS		\$2,500.00						
Mobilization	5%			\$12,500,00						
Traffic Control	\$6,250,00	LS		\$6,250,00						
Litility Coordination/Relocation	\$6,250.00	LS		\$6,250,00						
Stormwater Management/Erosion Control	5%			\$12,500.00						
Subtotal Additional Capital Improvement Costs				\$40,000,00						
Land Acquisition Costs				\$40,000.00						
ROW/Easements				\$0.00						
Subtotal Land Acquisition Costs				\$0.00						
Other Costs (percentage of Capital Improvement Costs)				25.00						
Engineering	15%	1		\$43,500.00						
I egal/Administrative	5%			\$14,500,00						
Contract Admin/Construction Management	10%			\$29,000.00						
Contingency	25%			\$72,500,00						
Subtotal Other Costs				\$159,500,00						
Total Capital Improvement Costs	\$449,500.00									
Master Plan Operation and Maintenan										
Description	Quantity	Unit	Unit Cost	Total Annual Cost						
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00						
Total Annual Operation and Maintenance Cost				\$122.00						
Effective Interest Rate				1.50%						
Total Operation and Maintenance Costs Over 50 Years			Total Operation and Maintenance Costs Over 50 Years							

MAS								
PROJECT :	Boulder Creek MDP - Reach 2							
DRAINAGEWAY :	Boulder Creek							
REACH :	2D							
JURISDICTION :	Weld County							
REACH ID:	BCM-Reach2D	Jeremy Deischer		DATE :	2015-04-22			
					TOTAL			
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS		
Special Items (User Defined)								
Modify Ditch for Aquatic & Habitat Passage	curl Iser Defined Items	1	1.5	\$250,000,00	\$250,000,00			
moully Dicition Aquatic & Habitat Lassage			L.U.	φ230,000.00	\$230,000.00			
	Master Plan Capital Improv	vement Cost Su	mmary					
Capital Improvement Costs	muster i fun oupitur impro	vement 005t out	initial y					
Pipe Cultorte and Storm Draine					\$0.00			
Concrete Box Culterte					\$0.00			
Hudrouse Structures					\$0.00			
Choppel Improvements					\$0.00			
Charlier Improvements					\$0.00			
Detention/Water Quality Facilities					\$0.00			
Removals					\$0.00			
Landscaping and Maintenance Improvements					\$0.00			
Special Items (User Defined)					\$250,000.00			
Subtotal Capital Improvement Costs					\$250,000.00			
Additional Capital Improvement Co	sts	1	1		1			
Dewatering		\$2,500.00	L.S.		\$2,500.00			
Mobilization		5%			\$12,500.00			
Traffic Control		\$6,250.00	L.S.		\$6,250.00			
Utility Coordination/Relocation		\$6,250.00	L.S.		\$6,250.00			
Stormwater Management/Erosion Control		5%			\$12,500.00			
Subtotal Additional Capital Improvement Cos	sts				\$40,000.00			
Land Acquisition Costs					-			
ROW/Easements					\$0.00			
Subtotal Land Acquisition Costs					\$0.00			
Other Costs (percentage of Capita	I Improvement Costs)							
Engineering		15%			\$43,500.00			
Legal/Administrative		5%			\$14,500.00			
Contract Admin/Construction Management		10%			\$29,000.00			
Contingency		25%			\$72,500.00			
Subtotal Other Costs		\$159,500.00						
Total Capital Improvement Costs								
Maste	Master Plan Operation and Maintenance Cost Summary							
Description		Quantity	Unit	Unit Cost	Total Annual Cost			
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00			
Total Annual Operation and Ma	intenance Cost				\$122.00			
Effective Interest Rate					1.50%			
Total Operation and Maintonan	an Contro Over EO Venro				\$4 270.00			
rotal operation and waintenan	Ce Cosis Over ou rears	34.270.00						

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MA	]					
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PROJECT :	Boulder Creek MDP - Reach 2					
DRAINAGEWAY :	Boulder Creek					
REACH :	2E					
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach2E	Jeremy Deischer		DATE :	2015-04-22	
	L					1
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
180 ft span bridge	<user defined="" items<="" td=""><td>5400</td><td>SF</td><td>\$250.00</td><td>\$1,350,000.00</td><td>30 ft width bridge</td></user>	5400	SF	\$250.00	\$1,350,000.00	30 ft width bridge
Removal of old bridge	<user defined="" items<="" td=""><td>3900</td><td>SF</td><td>\$50.00</td><td>\$195,000.00</td><td>130 ft x 30 ft</td></user>	3900	SF	\$50.00	\$195,000.00	130 ft x 30 ft
	Master Plan Capital Improv	ement Cost Su	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,545,000.00	
Subtotal Capital Improvement Costs					\$1,545,000.00	
Additional Capital Improvement Co	osts					
Dewatering		\$15,450.00	L.S.		\$15,450.00	
Mobilization		5%			\$77,250.00	
Traffic Control		\$38,625.00	L.S.		\$38,625.00	
Utility Coordination/Relocation		\$38,625.00	L.S.		\$38,625.00	
Stormwater Management/Erosion Control		5%			\$77,250.00	
Subtotal Additional Capital Improvement Co	sts				\$247,200.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	ii Improvement Costs)	4.50/			\$000.000.00	
Engineering		15%			\$268,830.00	
Contract Admin/Construction Management		3%			\$09,010.00	
Contract Aurhitr Construction Management		25%			\$179,220.00	
Subtotal Other Costs		2370			\$985 710 00	
Total Capital Improvement Con	to				\$2 777 010 00	
Total Capital Improvement Cos	ts					
Maste	Plan Operation and Maintenan	o Cost Summar	v			
Description	a rian operation and Maintenand	Ouentity	y Unit	Unit Cool	Total Annual Coort	
Channel Maintenance (e.g. sediment & debrie r	removal erosion tree & weed removal etc.)	Quantity 30	LF	S2 00	s12.00	
Tetal Appreciation and Ma	entoval, eroaron, iree o weed removal, etc.)	30	LF.	φ2.00	\$12.00	
Effective Interest Rate	antenance Cost				<b>\$12.00</b>	
Total Operation and Maintenan	co Costs Over 50 Vears				\$420.00	
Total Operation and walntenan	ice cosis over so rears	\$420.00				

MA						
PROJECT :	Boulder Creek MDP - Reach 2		-			
DRAINAGEWAY :	Boulder Creek					
REACH :	2F			-		
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach2F	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
Riverbank Spillway	<user defined="" items<="" td=""><td>20</td><td>L.S.</td><td>\$225.000.00</td><td>\$4,500,000,00</td><td></td></user>	20	L.S.	\$225.000.00	\$4,500,000,00	
Lateral Spillway	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$225,000.00</td><td>\$225,000,00</td><td></td></user>	1	L.S.	\$225,000.00	\$225,000,00	
	Master Plan Canital	Improvement Cost Su	mmary			
Canital Improvement Costs	muster i full oupitur	improvement oost ou	i i i i i i i i i i i i i i i i i i i			
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements		\$0.00				
Special Items (User Defined)					\$4,725,000,00	
Subtotal Capital Improvement Costs					\$4,725,000,00	
Additional Capital Improvement Co	ete				* .,. = 0,000	
Dewatering		\$47,250.00	LS		\$47,250.00	
Mobilization		5%			\$236,250,00	
Traffic Control		\$118.125.00	L.S.		\$118,125.00	
Utility Coordination/Relocation		\$118 125 00	LS		\$118 125 00	
Stormwater Management/Erosion Control		5%			\$236,250.00	
Subtotal Additional Capital Improvement Co	sts				\$756.000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$822,150.00	
Legal/Administrative		5%			\$274,050.00	
Contract Admin/Construction Management		10%			\$548,100.00	
Contingency		25%			\$1,370,250.00	
Subtotal Other Costs					\$3,014,550.00	
Total Capital Improvement Cost	ts				\$8,495,550.00	
Maste	r Plan Operation and Maint	enance Cost Summar	ry			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	21	EA	\$608.00	\$2,554.00	
Total Annual Operation and Ma	intenance Cost				\$2,554.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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MA						
PROJECT :	Boulder Creek MDP - Reach 2					
DRAINAGEWAY :	Boulder Creek					-
REACH :	2G					
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach2G	Jeremy Deischer		DATE :	2015-04-22	
					ΤΟΤΑΙ	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Stream Restoration	<user defined="" items<="" td=""><td>2000</td><td>L.F.</td><td>\$133.00</td><td>\$266.000.00</td><td></td></user>	2000	L.F.	\$133.00	\$266.000.00	
ERC Riparian Restoration	<user defined="" items<="" td=""><td>18</td><td>AC</td><td>\$35,000,00</td><td>\$642,792.00</td><td>200 ft. on each side of river</td></user>	18	AC	\$35,000,00	\$642,792.00	200 ft. on each side of river
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$908,792.00	
Subtotal Capital Improvement Costs					\$908,792.00	
Additional Capital Improvement Co	sts		-			
Dewatering		\$9,087.92	L.S.		\$9,088.00	
Mobilization		5%			\$45,440.00	
Traffic Control		\$22,719.80	L.S.		\$22,720.00	
Utility Coordination/Relocation		\$22,719.80	L.S.		\$22,720.00	
Stormwater Management/Erosion Control		5%			\$45,440.00	
Subtotal Additional Capital Improvement Cos	sts				\$145,408.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$158,130.00	
Legal/Administrative		5%			\$52,710.00	
Contract Admin/Construction Management		10%			\$105,420.00	
Contingency		25%			\$263,550.00	
Subtotal Other Costs					\$579,810.00	
Total Capital Improvement Cost	ts	\$1,634,010.00				
Maste	r Plan Operation and Maintenand	e Cost Summar	у		1	
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	2000	L.F.	\$2.00	\$800.00	
Total Annual Operation and Ma	intenance Cost				\$800.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$28,000.00				

MA						
	<u>ل</u>					
PROJECT :	Boulder Creek MDP - Reach 3					
DRAINAGEWAY :	Boulder Creek					
REACH :	3A					
JURISDICTION :	Weld County			1		
REACH ID:	BCM-Reach3A	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
ERC Stream Restoration	<user defined="" items<="" td=""><td>2000</td><td>L.F</td><td>\$135.00</td><td>\$270,000.00</td><td></td></user>	2000	L.F	\$135.00	\$270,000.00	
ERC Riparian Restoration	<user defined="" items<="" td=""><td>18</td><td>AC</td><td>\$35,000.00</td><td>\$642,792.00</td><td>200 ft. on each side of stream</td></user>	18	AC	\$35,000.00	\$642,792.00	200 ft. on each side of stream
C						
	Master Plan Capital Improv	vement Cost Sur	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$912,792.00	
Subtotal Capital Improvement Costs					\$912,792.00	
Additional Capital Improvement Co	sts					
Dewatering		\$9,127.92	L.S.		\$9,128.00	
Mobilization		5%			\$45,640.00	
Traffic Control		\$22,819.80	L.S.		\$22,820.00	
Utility Coordination/Relocation		\$22,819.80	L.S.		\$22,820.00	
Stormwater Management/Erosion Control		5%			\$45,640.00	
Subtotal Additional Capital Improvement Co	sts				\$146,048.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)	1			1	
Engineering		15%			\$158,826.00	
Legal/Administrative		5%			\$52,942.00	
Contract Admin/Construction Management		10%			\$105,884.00	
Contingency		25%	L		\$264,710.00	
Subtotal Other Costs					\$582,362.00	
Total Capital Improvement Cost	ts	\$1,641,202.00				
Maste	r Plan Operation and Maintenan	ce Cost Summar	У			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	2000	L.F.	\$2.00	\$800.00	
Total Annual Operation and Ma	intenance Cost				\$800.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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UD-MPCostv2.2\_Reach3.xlsm, BCM-Reach3A

MASTER PLAN COST ESTIMAT									
					1				
PROJECT : Boulder Creek MDP - Reach 3									
DRAINAGEWAY : Boulder Creek									
REACH : 3B									
JURISDICTION : Weld County									
REACH ID: BCM-Reach3B	Jeremy Deischer		DATE :	2015-04-22					
				TOTAL					
DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS				
Special Items (User Defined)									
Riverside Spillway	1	FΔ	\$225,000,00	\$225,000,00					
( oor beind tens		2.1	Q220,000.00	Q220,000.00					
Master Plan Capital Impro	vement Cost Su	mmary							
Capital Improvement Costs									
Pipe Culverts and Storm Drains				\$0.00					
Concrete Box Culverts				\$0.00					
Hydraulic Structures				\$0.00					
Channel Improvements				\$0.00					
Detention/Water Quality Eacilities				\$0.00					
Bemovals				\$0.00					
Landscaping and Maintenance Improvements				\$0.00					
Special Items (I ker Defined)				\$225,000,00					
Subtotal Canital Improvement Costs				\$225,000,00					
Additional Capital Improvement Costs				\$220,000.00					
Dewatering	\$2,250,00	LS		\$2,250.00					
Mobilization	5%			\$11,250,00					
Traffic Control	\$5.625.00	LS		\$5,625,00					
Litity Coordination/Belocation	\$5,625,00	1.5		\$5,625.00					
Stormwater Management/Erosion Control	5%			\$11,250,00					
Subtotal Additional Capital Improvement Costs				\$36,000,00					
Land Acquisition Costs				\$00,000.00					
ROW/Fasements				\$0.00					
Subtotal Land Acquisition Costs				\$0.00					
Other Costs (percentage of Capital Improvement Costs)				<del>\$0.00</del>					
Engineering	15%	1		\$39,150,00					
I ega/Administrative	5%			\$13,050,00					
Contract Admin/Construction Management	10%			\$26,100,00					
Contingency	25%			\$65,250,00					
Subtotal Other Costs				\$143,550.00					
Total Capital Improvement Costs				\$404,550.00					
					·				
Master Plan Operation and Maintenan									
Description	Quantity	Unit	Unit Cost	Total Annual Cost					
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00					
Total Annual Operation and Maintenance Cost				\$122.00					
Effective Interest Rate			-	1.50%					
Total Operation and Maintenance Costs Over 50 Years		Total Operation and Maintenance Costs Over 50 Years							

MAS						
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4A					
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach4A	Jeremy Deischer		DATE :	04-22-2015	
					ΤΟΤΑΙ	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)	1	1		1		
Modify Ditch for Aquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$250,000.00</td><td>\$250,000.00</td><td></td></user>	1	L.S.	\$250,000.00	\$250,000.00	
	Master Plan Capital Impro	ovement Cost Su	mmary			
Capital Improvement Costs					1	
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements		\$0.00				
Special Items (User Defined)		\$250,000.00				
Subtotal Capital Improvement Costs					\$250,000.00	
Additional Capital Improvement Co	sts					
Dewatering		\$2,500.00	L.S.		\$2,500.00	
Mobilization		5%			\$12,500.00	
Traffic Control		\$6,250.00	L.S.		\$6,250.00	
Utility Coordination/Relocation		\$6,250.00	L.S.		\$6,250.00	
Stormwater Management/Erosion Control		5%			\$12,500.00	
Subtotal Additional Capital Improvement Cos	ats				\$40,000,00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)				1	
Engineering		15%			\$43,500.00	
Legal/Administrative		5%			\$14,500,00	
Contract Admin/Construction Management		10%			\$29,000,00	
Contingency		25%			\$72,500,00	
Subtotal Other Costs					\$159,500.00	
Total Capital Improvement Costs \$						
· · · ·					· · · · · · · · · · · · · · · · · · ·	
Maste	r Plan Operation and Maintenar	nce Cost Summar	ry			
Description	•	Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Ma	intenance Cost				\$122.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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MAS	STER PLAN COST ESTIMAT	E FOR INDIV	IDUAL RE	ACH		1
						-
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4B					
JURISDICTION :	Boulder County	harris Dalashar			04.00.0045	
REACH ID:	BCM-Reach4B	Jeremy Deischer		DATE :	04-22-2015	1
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Soil Riprap, Type M		178	C.Y.	\$85.00	\$15,111.00	400 L.F. of Right Bank stabilization
Landscaping and Maintenance	Improvements					
Reclamation & seeding (native grasses)	1	0	ACRE	\$1,217,00	\$304.00	
Special Home (User Defined)		· · · · · ·				
Special items (Oser Defined)	Have Defined house	7000	0.5	\$050.00	£4,000,000,00	10 (s) (s.
Old bridge removal	<user defined="" items<="" td=""><td>/200</td><td>3.F. S.E</td><td>\$230.00</td><td>\$1,800,000.00</td><td>40 ft waar 120 ft x 40 ft</td></user>	/200	3.F. S.E	\$230.00	\$1,800,000.00	40 ft waar 120 ft x 40 ft
Old bildge femoval		4000	0.1.	\$30.00	\$240,000.00	12011 2 4010
	Master Dian Canital Immun	company Coast Ore				
	Master Plan Capital Improv	ement Cost Sul	mmary			
Capital Improvement Costs					<b>60.00</b>	
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Cuiverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$15,111.00	
Deterition/Water Quality Facilities					\$0.00	
Landecaping and Maintenance Improvements					\$0.00	
Special Items (Liser Defined)					\$2.040.000.00	
Subtotal Capital Improvement Costs					\$2,055,415,00	
Additional Capital Improvement Co	ete				\$2,000,410.00	
Dewatering		\$20,554,15	LS		\$20,554,00	
Mobilization		5%			\$102 771.00	
Traffic Control		\$51,385,38	L.S.		\$51,385.00	
Utility Coordination/Relocation		\$51,385,38	L.S.		\$51,385.00	
Stormwater Management/Erosion Control		5%			\$102,771.00	
Subtotal Additional Capital Improvement Cos	sts				\$328.866.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)					
Engineering		15%			\$357,642.00	
Legal/Administrative		5%			\$119,214.00	
Contract Admin/Construction Management		10%			\$238,428.00	
Contingency		25%			\$596,070.00	
Subtotal Other Costs					\$1,311,354.00	
Total Capital Improvement Cost	s	\$3,695,635.00				
Maste	r Plan Operation and Maintenand	ce Cost Summar	.y			
Description	· · · · · · · · · · · · · · · · · · ·	Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	40	L.F.	\$2.00	\$16.00	
Total Annual Operation and Ma	intenance Cost				\$16.00	
Effective Interest Rate					1.50%	
Total Operation and Mclutanan	an Consta Over EQ Years				£500.00	
Total Operation and Maintenan	ce costs Over 50 Years	\$560.00				

MAS	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH								
PROJECT :	Boulder Creek MDP - Reach 4								
DRAINAGEWAY :	Boulder Creek								
REACH :	4B-100yr								
JURISDICTION :	Boulder County								
REACH ID:	BCM-Reach4B-100yr	Jeremy Deischer		DATE :	04-22-2015				
				1	1				
					TOTAL				
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS			
Channel Improvements									
Excavation, Mid Range		9458	C.Y.	\$29.00	\$274,282.00	Fill required to raise roadway			
Soil Riprap, Type M		178	C.Y.	\$85.00	\$15,111.00	400 L.F. RB Stabilization			
Landscaping and Maintenance	Improvements								
Paclamation & coording (nation graceses)		0	ACRE	\$1 217 00	\$204.00				
Or a sight to see (I have D a (in a sight	L		AUNE	\$1,217.00	3004.00				
Special items (User Defined)									
220 ft span bridge at County Line Road	<user defined="" items<="" td=""><td>8800</td><td>S.F.</td><td>\$250.00</td><td>\$2,200,000.00</td><td>40 ft. width</td></user>	8800	S.F.	\$250.00	\$2,200,000.00	40 ft. width			
Asphalt for roadway	<user defined="" items<="" td=""><td>7022</td><td>S.Y.</td><td>\$60.00</td><td>\$421,333.00</td><td>1580 ft. of roadway construction (N side)</td></user>	7022	S.Y.	\$60.00	\$421,333.00	1580 ft. of roadway construction (N side)			
Oid bridge removal	<oser denned="" items<="" td=""><td>4000</td><td><u>о.г</u>.</td><td>\$50.00</td><td>\$240,000.00</td><td>120 IL X 40 IL</td></oser>	4000	<u>о.г</u> .	\$50.00	\$240,000.00	120 IL X 40 IL			
	Master Plan Capital Improv	ement Cost Sur	nmary						
Capital Improvement Costs									
Pipe Culverts and Storm Drains					\$0.00				
Concrete Box Culverts					\$0.00				
Hydraulic Structures					\$0.00				
Channel Improvements					\$289,393.00				
Percention water Quality Facilities					\$0.00				
Landscaning and Maintenance Improvements					\$304.00				
Special Items (User Defined)					\$2.861.333.00				
Subtotal Capital Improvement Costs					\$3,151,030,00				
Additional Capital Improvement Co	sts								
Dewatering		\$31,510.30	L.S.		\$31,510.00				
Mobilization		5%			\$157,552.00				
Traffic Control		\$78,775.75	L.S.		\$78,776.00				
Utility Coordination/Relocation		\$78,775.75	L.S.		\$78,776.00				
Stormwater Management/Erosion Control		5%			\$157,552.00				
Subtotal Additional Capital Improvement Cos	its				\$504,166.00				
Land Acquisition Costs									
ROW/Easements					\$0.00				
Subtotal Land Acquisition Costs					\$0.00				
Other Costs (percentage of Capital	Improvement Costs)	450/			\$5.40.070.00				
Engineering		15%			\$548,279.00				
Centrast Admin/Construction Management		109/			\$102,700.00				
Contract Admin/Construction Management		25%			\$303,320.00				
Subtotal Other Costs		2370			\$2 010 358 00				
Total Canital Improvement Cost	•	\$5 665 554 00							
Total Capital improvement Cost	3				\$5,005,554.00				
	Disc. On continue on d Mail 1								
Maste	r Plan Operation and Maintenanc	e Cost Summar	у	1					
Description	and a second sec	Quantity	Unit	Unit Cost	Total Annual Cost				
Channel Maintenance (e.g. sediment & debris re	emoval, erosion, tree & weed removal, etc.)	40	L.F.	\$2.00	\$16.00				
Total Annual Operation and Ma	intenance Cost				\$16.00				
Effective Interest Rate					1.50%				
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years				\$560.00				

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MA	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH								
						<u>.</u>			
PROJECT :	Boulder Creek MDP - Reach 4								
DRAINAGEWAY :	Boulder Creek								
REACH :	4C-Boulder								
JURISDICTION :	Boulder County								
REACH ID:	BCM-Reach4C-Boulder	Jeremy Deischer		DATE :	04-22-2015				
		1			τοται				
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS			
Special Items (User Defined)									
Riverbank Spillway	<user defined="" items<="" td=""><td>11</td><td>LS</td><td>\$225,000,00</td><td>\$2,475,000,00</td><td></td></user>	11	LS	\$225,000,00	\$2,475,000,00				
Lateral Spillway	<user defined="" items<="" td=""><td>2</td><td>L.S.</td><td>\$225,000.00</td><td>\$450,000.00</td><td></td></user>	2	L.S.	\$225,000.00	\$450,000.00				
	Master Plan Capital Impro	vement Cost Su	mmarv						
Capital Improvement Costs									
Pipe Culverts and Storm Drains					\$0.00				
Concrete Box Culverts	-				\$0.00				
Hydraulic Structures					\$0.00				
Channel Improvements					\$0.00				
Detention/Water Quality Facilities					\$0.00				
Removals					\$0.00				
Landscaping and Maintenance Improvements					\$0.00				
Special Items (User Defined)					\$2,925,000.00				
Subtotal Capital Improvement Costs					\$2,925,000.00				
Additional Capital Improvement Co	sts	1	1		1				
Dewatering		\$29,250.00	L.S.		\$29,250.00				
Mobilization		5%			\$146,250.00				
Traffic Control		\$73,125.00	L.S.		\$73,125.00				
Utility Coordination/Relocation		\$73,125.00	L.S.		\$73,125.00				
Stormwater Management/Erosion Control		5%			\$146,250.00				
Subtotal Additional Capital Improvement Co	sts				\$468,000.00				
ROW/Easements					\$0.00				
Subtotal Land Acquisition Costs					\$0.00				
Other Costs (percentage of Capita	I Improvement Costs)								
Engineering		15%			\$508,950.00				
Legal/Administrative		5%			\$169,650.00				
Contract Admin/Construction Management		10%			\$339,300.00				
Contingency		25%			\$848,250.00				
Subtotal Other Costs					\$1,866,150.00				
Total Capital Improvement Cost	ts				\$5,259,150.00				
Maste	r Plan Operation and Maintenan	ce Cost Summar	у						
Description		Quantity	Unit	Unit Cost	Total Annual Cost				
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	13	EA	\$608.00	\$1,581.00				
Total Annual Operation and Ma	intenance Cost				\$1,581.00				
Effective Interest Rate					1.50%				
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years				\$55,335.00				

MAS						
PROJECT :	Boulder Creek MDP - Reach 4					-
DRAINAGEWAY :	Boulder Creek					-
REACH :	4C-Weld					-
JURISDICTION :	Weld County					
REACH ID:	BCM-Reach4C-Weld	Jeremy Deischer		DATE :	04-22-2015	
[		1		1		1
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Riverbank spillway	<user defined="" items<="" td=""><td>2</td><td>L.S.</td><td>\$225,000.00</td><td>\$450,000.00</td><td></td></user>	2	L.S.	\$225,000.00	\$450,000.00	
						IC.
	Master Plan Capital Impre	ovement Cost Su	mmary			
Capital Improvement Costs					1	
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$450,000.00	
Subtotal Capital Improvement Costs					\$450,000,00	
Additional Capital Improvement Co	sts					
Dewatering		\$4,500.00	LS		\$4,500.00	
Mobilization		5%			\$22,500,00	
Traffic Control		\$11,250,00	LS		\$11,250,00	
Litity Coordination/Belocation		\$11,250.00	1.5		\$11,250.00	
Stormwater Management/Erosion Control		5%			\$22,500.00	
Subtotal Additional Canital Improvement Con	He				\$72,000,00	
Land Acquisition Costs	515				\$72,000.00	
POW/Facemente					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (nercontere of Conits	Improvement Costo)				30.00	
Citier Costs (percentage of Capita	i inprovenient Costs)	159/	r		\$79,200,00	
Engineering		13%			\$78,300.00	
Legal/Administrative		5%			\$26,100.00	
Contract Admin/Construction Management		10%			\$52,200.00	
Contingency		25%			\$130,500.00	
Subtotal Other Costs					\$287,100.00	
Total Capital Improvement Costs						
Maste	r Plan Operation and Maintena	nce Cost Summar	ry	1	1	
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	2	EA	\$608.00	\$243.00	
Total Annual Operation and Ma	intenance Cost				\$243.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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MAST	1					
			-			1
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4D					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach4D	Jeremy Deischer				
F						
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Channel Improvements						
Soil Riprap, Type M		102	C.Y.	\$85.00	\$8,670.00	230 ft. x 6 ft. x 2 ft.
Excavation, Mid Range		188	C.Y.	\$29.00	\$5,452.00	Fill required in addition to soil riprap
Landscaping and Maintenance In	provements					
Reclamation & seeding (native grasses)		1	ACRE	\$1,217.00	\$609.00	
	Master Plan Capital Improv	ement Cost Sur	nmary			
Capital Improvement Costs		0000000				
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$14,122.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$609.00	
Special Items (User Defined)					\$0.00	
Subtotal Capital Improvement Costs					\$14,731.00	
Additional Capital Improvement Costs						
Dewatering		\$147.31	L.S.		\$147.00	
Mobilization		5%			\$737.00	
Traffic Control		\$368.28	L.S.		\$368.00	
Utility Coordination/Relocation		\$368.28	L.S.		\$368.00	
Stormwater Management/Erosion Control		5%			\$737.00	
Subtotal Additional Capital Improvement Costs					\$2,357.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital In	provement Costs)	450/			60.500.00	
Engineering		15%			\$2,563.00	
Legal/Administrative		5%			\$854.00	
Contract Admin/Construction Management		10%			\$1,709.00	
Subtotal Other Coete		2370			\$9,272.00	
					\$3,330.00	
Total Capital Improvement Costs		\$26,486.00				
Master F	Plan Operation and Maintenanc	e Cost Summar	у			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris rem	oval, erosion, tree & weed removal, etc.)	230	L.F.	\$2.00	\$92.00	
Total Annual Operation and Main	tenance Cost				\$92.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance	e Costs Over 50 Years				\$3,220.00	

MAS						
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4E					_
JURISDICTION :	Boulder County	Jaramu Dalaahar		DATE	04 22 2015	
REACH ID:	BCM-Reach4E	04-22-2015	1			
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Remove washed out bridge	<user defined="" items<="" td=""><td>1200</td><td>S.F.</td><td>\$50.00</td><td>\$60,000.00</td><td>15 ft. x 80 ft.</td></user>	1200	S.F.	\$50.00	\$60,000.00	15 ft. x 80 ft.
	Master Plan Capital Im	provement Cost Su	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements		\$0.00				
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$60,000.00	
Subtotal Capital Improvement Costs					\$60,000.00	
Additional Capital Improvement Co	its		1.0		0000.00	
Dewatering		\$600.00	L.S.		\$600.00	
Wobiization		5%	1.0		\$3,000.00	
Hame Control		\$1,500.00	L.S.		\$1,000.00	
Stormwater Management/Erosion Control		5%	L.U.		\$3,000,00	
Subtotal Additional Capital Improvement Cos	ts	0,0	L		\$9,600,00	
Land Acquisition Costs					\$3,500.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$10,440.00	
Legal/Administrative		5%			\$3,480.00	
Contract Admin/Construction Management		10%			\$6,960.00	
Contingency		25%			\$17,400.00	
Subtotal Other Costs					\$38,280.00	
Total Canital Improvement Cost	s				\$107 880 00	

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UD-MPCostv2.2\_Reach4.xlsm, BCM-Reach4E

MAS	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH								
PROJECT : DRAINAGEWAY : REACH :	Boulder Creek MDP - Reach 4 Boulder Creek								
JURISDICTION :	Boulder County								
REACH ID:	BCM-Reach4F	Jeremy Deischer		DATE :	04-22-2015				
					TOTAL				
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS			
Special Items (User Defined)									
ERC Estimate - New Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$1,130,000.00</td><td>\$1,130,000.00</td><td></td></user>	1	L.S.	\$1,130,000.00	\$1,130,000.00				
ERC Estimate - Riparian Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$2,730,000.00</td><td>\$2,730,000.00</td><td></td></user>	1	L.S.	\$2,730,000.00	\$2,730,000.00				
	Master Plan Capital Improv	ement Cost Sur	mmary						
Capital Improvement Costs									
Pipe Culverts and Storm Drains					\$0.00				
Concrete Box Culverts					\$0.00				
Hydraulic Structures					\$0.00				
Channel Improvements					\$0.00				
Detention/Water Quality Facilities					\$0.00				
Removals		\$0.00							
Landscaping and Maintenance Improvements					\$0.00				
Special Items (User Defined)					\$3,860,000.00				
Subtotal Capital Improvement Costs					\$3,860,000.00				
Additional Capital Improvement Cos	15	\$29,600,00	1.6		\$29,600,00				
Mobilization		\$30,000.00	L.0.		\$102,000,00				
Traffic Control		\$96,500,00	1.5		\$96,500,00				
Litility Coordination/Relocation		\$96,500.00	1.5		\$96,500.00				
Stormwater Management/Erosion Control		5%	her by t		\$193.000.00				
Subtotal Additional Capital Improvement Cos	s				\$617,600,00				
Land Acquisition Costs									
ROW/Easements					\$0.00				
Subtotal Land Acquisition Costs					\$0.00				
Other Costs (percentage of Capital	Improvement Costs)								
Engineering		15%			\$671,640.00				
Legal/Administrative		5%			\$223,880.00				
Contract Admin/Construction Management		10%			\$447,760.00				
Contingency		25%			\$1,119,400.00				
Subtotal Other Costs					\$2,462,680.00				
Total Capital Improvement Cost	S	\$6,940,280.00							
Master	Plan Operation and Maintenance	e Cost Summar	у						
Description		Quantity	Unit	Unit Cost	Total Annual Cost				
Channel Maintenance (e.g. sediment & debris re	moval, erosion, tree & weed removal, etc.)	8500	L.F.	\$2.00	\$3,400.00				
Total Annual Operation and Mai	intenance Cost				\$3,400.00				
Effective Interest Rate					1.50%				
Total Operation and Maintenand	ce Costs Over 50 Years				\$118,999.00				

MAS						
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4G			-		
JURISDICTION :	Boulder County	Joromy Dojechor	04-22-2015			
REACH ID.	DCmPRedCING	Serenny Deischer		DATE .	04-22-2013	1
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements		···				
Excavation, Mid Range		804	C.Y.	\$29.00	\$23,316.00	Cut & Haul
Excavation, Low Range		368	C.Y.	\$13.00	\$4,784.00	Cut & Fill Onsite
Soil Riprap, Type M		778	C.Y.	\$85.00	\$66,130.00	1050 ft. x 2 ft. x 5 ft.
Special Items (User Defined)				÷		
Modify Ditch for Aquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$250,000.00</td><td>\$250,000.00</td><td></td></user>	1	L.S.	\$250,000.00	\$250,000.00	
	Master Plan Capital Improv	ement Cost Sur	nmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$94,230.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$250,000.00	
Subtotal Capital Improvement Costs					\$344,230.00	
Additional Capital Improvement Cos	sts		1		-	
Dewatering		\$3,442.30	L.S.		\$3,442.00	
Mobilization		5%			\$17,212.00	
Iraffic Control		\$8,605.75	L.S.		\$8,606.00	
Utility Coordination/Relocation		\$8,605.75	L.S.		\$8,606.00	
Stormwater Management/Erosion Control		5%			\$17,212.00	
Land Acquisition Costs	ts				\$55,078.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$59,896.00	
Legal/Administrative		5%			\$19,965.00	
Contract Admin/Construction Management		10%			\$39,931.00	
Contingency		25%			\$99,827.00	
Subtotal Other Costs					\$219,619.00	
Total Capital Improvement Cost	S				\$618,927.00	
Maste	r Plan Operation and Maintenand	ce Cost Summar	у			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Channel Maintenance (e.g. sediment & debris re	emoval, erosion, tree & weed removal, etc.)	230	L.F.	\$2.00	\$92.00	
Total Annual Operation and Ma	intenance Cost				\$214.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$7 490 00				

MA	STER PLAN COST ESTIMAT	E FOR INDIV	DUAL RE	ACH		
1						
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4H					
JURISDICTION :	Boulder County					I
REACH ID:	BCM-Reach4H	Jeremy Deischer		DATE :	04-22-2015	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
180 ft. span bridge at Kenosha Road	<user defined="" items<="" td=""><td>7200</td><td>S.F.</td><td>\$250.00</td><td>\$1,800,000.00</td><td>40 ft. Bridge width</td></user>	7200	S.F.	\$250.00	\$1,800,000.00	40 ft. Bridge width
Old bridge removal	<user defined="" items<="" td=""><td>3600</td><td>S.F.</td><td>\$50.00</td><td>\$180,000.00</td><td>90 ft. x 40 ft.</td></user>	3600	S.F.	\$50.00	\$180,000.00	90 ft. x 40 ft.
	Master Plan Capital Improv	ement Cost Su	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,980,000.00	
Subtotal Capital Improvement Costs					\$1,980,000.00	
Additional Capital Improvement Co	osts					
Dewatering		\$19,800.00	L.S.		\$19,800.00	
Mobilization		5%			\$99,000.00	
Traffic Control		\$49,500.00	L.S.		\$49,500.00	
Utility Coordination/Relocation		\$49,500.00	L.S.		\$49,500.00	
Stormwater Management/Erosion Control		5%			\$99,000.00	
Subtotal Additional Capital Improvement Co	sts				\$316,800.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs	l Improvement Costo)				\$0.00	
Coner Costs (percentage of Capita	i improvement Costs)	1.50/	[		\$244 520 00	
Engineering		15%			\$344,520.00	
Contract Admin/Construction Management		10%			\$220,690,00	
Contract Admin/Construction Management		25%			\$229,000.00	
Subtotal Other Costs		2370			\$1,263,240.00	
Total Capital Improvement Cost	10				\$3 560 040 00	
Total Capital improvement Cos	15				\$3,300,040.00	
Maata	Plan Onesetian and Maintenand	a Cast Summar				
Waste	er Plan Operation and Maintenand	e Cost Summar	y			
Description Channel Maintenance (e.g. codiment <sup>e</sup> debries	amount excession tree & wood removal etc.)	Quantity	Unit	Unit Cost	I otal Annual Cost	
Tetel Annual Operation	emoval, erosion, tree & weeu removal, etc.)	40	L.F.	\$2.00	\$10.00	
Total Annual Operation and Ma	aintenance Cost				\$16.00	
Effective interest Rate					1.50%	
Total Operation and Maintenan	ice Costs Over 50 Years				\$560.00	

MAS						
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	41					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach4I	Jeremy Deischer		DATE :	04-22-2015	
				1		
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Grade Control for Aquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$205,000.00</td><td>\$205,000.00</td><td></td></user>	1	L.S.	\$205,000.00	\$205,000.00	
	Master Plan Capital Improv	vement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements		\$0.00				
Special Items (User Defined)					\$205.000.00	
Subtotal Capital Improvement Costs					\$205,000.00	
Additional Capital Improvement Co	sts					
Dewatering		\$2,050,00	LS		\$2,050,00	
Mobilization		5%			\$10.250.00	
Traffic Control		\$5,125,00	LS		\$5,125,00	
Utility Coordination/Relocation		\$5,125,00	LS		\$5,125,00	
Stormwater Management/Erosion Control		5%			\$10.250.00	
Subtotal Additional Capital Improvement Cos	de la companya de la				\$32,800,00	
Land Acquisition Costs					402,000.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)				\$0.00	
Engineering		15%			\$35,670,00	
Logal/Administrative		5%			\$11,990,00	
Contract Admin/Construction Management		10%			\$23,780,00	
Contingency		25%			\$59,450,00	
Subtotal Other Costs		2070			\$130,790.00	
Total Capital Improvement Cost	e				\$368 500 00	
Total Capital improvement cost	.5				\$300,330.00	
Masta	- Dian Operation and Maintenan	an Cont Summer				
Maste	r Plan Operation and Maintenan	ce cost Summar	y	Halt Oast	Total Annual Ocat	
Description	mount encoion atrustural renaire atr	Quantity	Unit	Unit Cost	F100 00	
nyurauro Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	3008.00	\$122.00	
Total Annual Operation and Ma	intenance Cost				\$122.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$4.270.00				

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MA	STER PLAN COST ESTIMA	TE FOR INDIV	IDUAL RE	ACH		1
						-
PROJECT :	Boulder Creek MDP - Reach 4					
DRAINAGEWAY :	Boulder Creek					
REACH :	4J					
JURISDICTION :	Boulder County	been Delector			04.00.0045	
REACH ID:	BCM-Reach4J	Jeremy Deischer		DATE :	04-22-2015	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
180 ft. span bridge at 109th St.	<user defined="" items<="" td=""><td>5400</td><td>S.F.</td><td>\$250.00</td><td>\$1,350,000.00</td><td>30 ft. bridge width</td></user>	5400	S.F.	\$250.00	\$1,350,000.00	30 ft. bridge width
Old bridge removal	<user defined="" items<="" td=""><td>2400</td><td>S.F.</td><td>\$50.00</td><td>\$120,000.00</td><td>80 ft. x 30 ft.</td></user>	2400	S.F.	\$50.00	\$120,000.00	80 ft. x 30 ft.
Stream Restoration	<user defined="" items<="" td=""><td>1</td><td>Mile</td><td>\$575,000.00</td><td>\$350,750.00</td><td>Average of New and Existing Stream Restoration</td></user>	1	Mile	\$575,000.00	\$350,750.00	Average of New and Existing Stream Restoration
Riparian Restoration	<user defined="" items<="" td=""><td>18</td><td>ACRE</td><td>\$35,000.00</td><td>\$623,000.00</td><td></td></user>	18	ACRE	\$35,000.00	\$623,000.00	
	Master Plan Capital Impro	vement Cost Su	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,443,750.00	
Subtotal Capital Improvement Costs					\$2,443,750.00	
Additional Capital Improvement Co	osts					
Dewatering		\$24,437.50	L.S.		\$24,438.00	
Mobilization		5%			\$122,188.00	
Traffic Control		\$61,093.75	L.S.		\$61,094.00	
Utility Coordination/Relocation		\$61,093.75	L.S.		\$61,094.00	
Stormwater Management/Erosion Control		5%			\$122,188.00	
Subtotal Additional Capital Improvement Co	sts				\$391,002.00	
Land Acquisition Costs					£0.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs	I Improvement Conto)				\$0.00	
Other Costs (percentage of Capita	i improvement Costs)	4.59/	1		£425 212 00	
Engineering		5%			\$141 729.00	
Contract Admin/Construction Management		10%			\$292.475.00	
Contingency		25%			\$709,699,00	
Subtotal Other Costs		2070			\$1 559 114 00	
Total Capital Improvement Cost	to				\$4 202 966 00	
Total Capital Improvement Cos	ts				\$4,393,000.00	
Maata	Disc. On continue on d Mainton on					
Maste	er Plan Operation and Maintenan	ice Cost Summar	y			
Description	amount aronion tree 9 used remark	Quantity	Unit	Unit Cost	I otal Annual Cost	
channer waintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	30	L.F.	\$2.00	\$12.00	
Filestic Interest Pate	aintenance Cost				\$12.00	
Total Operation and Meintener	An Costa Over El Vesta				1.50% \$420.00	
Total Operation and Maintenan	ice Costs Over 50 Years	ə420.00				

MAST							
PROJECT :	Boulder Creek MDP - Reach 4						
DRAINAGEWAY :	Boulder Creek						
REACH :	4K						
JURISDICTION :	Boulder County						
REACH ID:	BCM-Reach4K	Jeremy Deischer		DATE :	04-22-2015		
P							
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS	
Special Items (User Defined)							
ERC Stream Restoration <	User Defined Items	4600	L.F.	\$133.00	\$611,800.00		
ERC Riparian Restoration	User Defined Items	42	AC	\$35,000.00	\$1,478,421.00	200 ft on each side of stream	
	Master Plan Capital Improv	ement Cost Sur	nmary				
Capital Improvement Costs							
Pipe Culverts and Storm Drains					\$0.00		
Concrete Box Culverts					\$0.00		
Hydraulic Structures					\$0.00		
Channel Improvements					\$0.00		
Detention/Water Quality Facilities					\$0.00		
Removals					\$0.00		
Landscaping and Maintenance Improvements					\$0.00		
Special Items (User Defined)					\$2,090,221.00		
Subtotal Capital Improvement Costs					\$2,090,221.00		
Additional Capital Improvement Costs	s						
Dewatering		\$20,902.21	L.S.		\$20,902.00		
Mobilization		5%			\$104,511.00		
Traffic Control		\$52,255.53	L.S.		\$52,256.00		
Utility Coordination/Relocation		\$52,255.53	L.S.		\$52,256.00		
Stormwater Management/Erosion Control		5%			\$104,511.00		
Subtotal Additional Capital Improvement Costs	;				\$334,436.00		
Land Acquisition Costs							
ROW/Easements					\$0.00		
Subtotal Land Acquisition Costs					\$0.00		
Other Costs (percentage of Capital In	nprovement Costs)						
Engineering		15%			\$363,699.00		
Legal/Administrative		5%			\$121,233.00		
Contract Admin/Construction Management		10%			\$242,466.00		
Contingency		25%			\$606,164.00		
Subtotal Other Costs					\$1,333,562.00		
<b>Total Capital Improvement Costs</b>					\$3,758,219.00		
Master	Master Plan Operation and Maintenance Cost Summary						
Description		Quantity	Unit	Unit Cost	Total Annual Cost		
Channel Maintenance (e.g. sediment & debris rem	noval, erosion, tree & weed removal, etc.)	4600	L.F.	\$2.00	\$1,840.00		
Total Annual Operation and Main	ntenance Cost				\$1,840.00		
Effective Interest Rate					1.50%		
Total Operation and Maintenance	e Costs Over 50 Years				\$64,399.00		

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MAS						
PPO JECT -	Rouldor Crook MDR - Roach 5		-	-		
DRAINAGEWAY	Boulder Creek					
REACH	54					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5A	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Estimated New Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$600,000.00</td><td>\$600,000.00</td><td></td></user>	1	L.S.	\$600,000.00	\$600,000.00	
ERC Estimated Riparian Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$1,450,000.00</td><td>\$1,450,000.00</td><td></td></user>	1	L.S.	\$1,450,000.00	\$1,450,000.00	
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,050,000.00	
Subtotal Capital Improvement Costs					\$2,050,000.00	
Additional Capital Improvement Co	sts	-	-			
Dewatering		\$20,500.00	L.S.		\$20,500.00	
Mobilization		5%			\$102,500.00	
Traffic Control		\$51,250.00	L.S.		\$51,250.00	
Utility Coordination/Relocation		\$51,250.00	L.S.		\$51,250.00	
Stormwater Management/Erosion Control		5%			\$102,500.00	
Subtotal Additional Capital Improvement Co	sts				\$328,000.00	
Eand Acquisition Costs					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)				\$0.00	
Engineering		15%			\$356,700,00	
Legal/Administrative		5%			\$118,900.00	
Contract Admin/Construction Management		10%			\$237.800.00	
Contingency		25%			\$594,500.00	
Subtotal Other Costs		\$1,307,900.00				
Total Capital Improvement Cost	s	\$3,685,900.00				
· · · ·						
Maste	r Plan Operation and Maintenand	e Cost Summar	v			
Description	· · · · · · · · · · · · · · · · · · ·	Total Annual Cost				
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	4500	L.F.	\$2.00	\$1,800.00	
Total Annual Operation and Ma	intenance Cost				\$1,800.00	
Effective Interest Rate					1.50%	
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years	\$62,999.00				

MAS						
PROJECT :	Boulder Creek MDP - Reach 5					
DRAINAGEWAY :	Boulder Creek					
REACH :	5B					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5B	Jeremy Deischer		DATE :	2015-04-22	
r					TOTAL	
DECODIDITION		OUANTITY			TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)				1		
Modify Ditch for Aquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$250,000.00</td><td>\$250,000.00</td><td></td></user>	1	L.S.	\$250,000.00	\$250,000.00	
	Martin Plan Ornital Imm					
0	Master Plan Capital Impro	ovement Cost Sui	mmary			
Capital Improvement Costs					\$0.00	
Concrete Rev Culterite					\$0.00	
Concrete Box Colvens					\$0.00	
Chonnel Improvemente					\$0.00	
Charlier Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals		\$0.00				
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$250,000.00	
Subtotal Capital Improvement Costs					\$250,000.00	
Additional Capital Improvement Co	sts		1		1	
Dewatering		\$2,500.00	L.S.		\$2,500.00	
Mobilization		5%			\$12,500.00	
Traffic Control		\$6,250.00	L.S.		\$6,250.00	
Utility Coordination/Relocation		\$6,250.00	L.S.		\$6,250.00	
Stormwater Management/Erosion Control		5%			\$12,500.00	
Subtotal Additional Capital Improvement Cos	its				\$40,000.00	
Land Acquisition Costs					-	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$43,500.00	
Legal/Administrative		5%			\$14,500.00	
Contract Admin/Construction Management		10%			\$29,000.00	
Contingency		25%			\$72,500.00	
Subtotal Other Costs					\$159,500.00	
Total Capital Improvement Cost	S	\$449,500.00				
		·				
Maste						
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Maintenance Cost						
Effective Interest Rate						
Total Operation and Maintenance Costs Over 50 Years						

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UD-MPCostv2.2\_Reach5.xlsm, BCM-Reach5B

MA						
PROJECT :	Boulder Creek MDP - Reach 5					
DRAINAGEWAY :	Boulder Creek					
REACH :	5C					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5C	Jeremy Deischer		DATE :	2015-04-22	
P						
DESCRIPTION		OUANTITY	UNIT	UNIT COST	TOTAL	
DESCRIPTION		QUANTIT	UNII	UNIT COST	CUSI	USER COMMENTS
Special Items (User Defined)					1	
Riverbank spillway	<user defined="" items<="" td=""><td>5</td><td>L.S.</td><td>\$225,000.00</td><td>\$1,125,000.00</td><td></td></user>	5	L.S.	\$225,000.00	\$1,125,000.00	
Lateral spillway	<user defined="" items<="" td=""><td>0</td><td>L.S.</td><td>\$225,000.00</td><td>\$0.00</td><td></td></user>	0	L.S.	\$225,000.00	\$0.00	
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/water Quality Facilities					\$0.00	
Removals					\$0.00	
Special Items (Liser Defined)					\$1.125.000.00	
Subtotal Capital Improvement Costs					\$1,125,000.00	
Additional Capital Improvement Co	ete .				\$1,120,000100	
Dewatering		\$11,250.00	LS		\$11,250,00	
Mobilization		5%			\$56,250,00	
Traffic Control		\$28,125.00	L.S.		\$28,125.00	
Utility Coordination/Relocation		\$28,125.00	L.S.		\$28,125.00	
Stormwater Management/Erosion Control		5%			\$56,250.00	
Subtotal Additional Capital Improvement Co	sts				\$180,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)	1	1		1	
Engineering		15%			\$195,750.00	
Legal/Administrative		5%			\$65,250.00	
Contract Admin/Construction Management		10%			\$130,500.00	
Contingency		25%			\$326,250.00	
Subtotal Other Costs					\$/17,750.00	
Total Capital Improvement Cost	IS	\$2,022,750.00				
Maste						
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	5	EA	\$608.00	\$608.00	
Total Annual Operation and Ma	intenance Cost				\$608.00	
Effective Interest Rate					1.50%	
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years				\$21,280.00	

MAS						
PROJECT :						
DRAINAGEWAY :	Boulder Creek					
REACH :	5D					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5D	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Grade Control for Acquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$205.000.00</td><td>\$205.000.00</td><td></td></user>	1	L.S.	\$205.000.00	\$205.000.00	
	Master Plan Capital Impro	vement Cost Su	mmary			
Capital Improvement Costs			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Mater Quality Eacilities					\$0.00	
Determonity valer quality racintes					\$0.00	
Landecaning and Maintenance Improvemente		\$0.00				
Special Items (Lear Defined)					\$205,000,00	
Subtetal Capital Improvement Casta					\$205,000.00	
Subtotal Capital Improvement Costs	ata				\$205,000.00	
Additional Capital Improvement Co	515	\$2,050,00	1.6		\$2.050.00	
Mehilization		\$2,030.00	L.O.		\$2,030.00	
Troffic Control		\$5 125 00	1.6		\$F 125.00	
Hallic Control		\$5,125.00	L.S.		\$5,125.00	
Stormuster Management/Eracion Control		\$5,125.00 5%	L.O.		\$5,125.00	
Outrained Additional Cardia Linear Control	4-	570			\$10,230.00	
Subtotal Additional Capital Improvement Cos	15				\$32,800.00	
Land Acquisition Costs					£0.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)	450/			for 070 00	
Engineering		15%			\$35,670.00	
Legal/Administrative		5%			\$11,890.00	
Contract Admin/Construction Management		10%			\$23,780.00	
Subtetal Other Casta		23%			\$39,430.00	
Subtotal Other Costs					\$130,790.00	
Total Capital Improvement Cost	S	\$368,590.00				
Maste	r Plan Operation and Maintenan					
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Maintenance Cost						
Effective Interest Rate		1.50%				
Total Operation and Maintenance Costs Over 50 Years						

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MASTER PLAN COST ESTIMAT									
					1				
PROJECT : Boulder Creek MDP - Reach 5									
DRAINAGEWAY : Boulder Creek									
REACH : 5E									
JURISDICTION : Boulder County									
REACH ID: BCM-Reach5E	Jeremy Deischer		DATE :	2015-04-22					
· · · · · · · · · · · · · · · · · · ·	T		T	1					
				TOTAL					
DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS				
Special Items (User Defined)									
Grade Control for Acquatic & Habitat Passage <user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$205,000.00</td><td>\$205,000.00</td><td></td></user>	1	L.S.	\$205,000.00	\$205,000.00					
Master Plan Capital Impro	vement Cost Su	mmarv							
Capital Improvement Costs									
Pipe Culverts and Storm Drains				\$0.00					
Concrete Box Culverts				\$0.00					
Hydraulic Structures				\$0.00					
Channel Improvements				\$0.00					
Detention/Water Quality Facilities				\$0.00					
Removals				\$0.00					
Landscaping and Maintenance Improvements				\$0.00					
Special Items (User Defined)				\$205,000.00					
Subtotal Capital Improvement Costs				\$205,000.00					
Additional Capital Improvement Costs									
Dewatering	\$2,050.00	L.S.		\$2,050.00					
Mobilization	5%			\$10,250.00					
Traffic Control	\$5,125.00	L.S.		\$5,125.00					
Utility Coordination/Relocation	\$5,125.00	L.S.		\$5,125.00					
Stormwater Management/Erosion Control	5%			\$10,250.00					
Subtotal Additional Capital Improvement Costs				\$32,800.00					
Land Acquisition Costs									
ROW/Easements				\$0.00					
Subtotal Land Acquisition Costs				\$0.00					
Other Costs (percentage of Capital Improvement Costs)									
Engineering	15%			\$35,670.00					
Legal/Administrative	5%			\$11,890.00					
Contract Admin/Construction Management	10%			\$23,780.00					
Contingency	25%			\$59,450.00					
Subtotal Other Costs				\$130,790.00					
Total Capital Improvement Costs				\$368,590.00					
Master Plan Operation and Maintenan									
Description	Total Annual Cost								
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00					
Total Annual Operation and Maintenance Cost	\$122.00								
Effective Interest Rate	1.50%								
Total Operation and Maintenance Costs Over 50 Years		Total Operation and Maintenance Costs Over 50 Years							

MAS						
PROJECT :	Boulder Creek MDP - Reach 5					
DRAINAGEWAY :	Boulder Creek					
REACH :	5F					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5F	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
ERC New Stream Restoration	<user defined="" items<="" td=""><td>2000</td><td>L.F.</td><td>\$133.00</td><td>\$266.000.00</td><td></td></user>	2000	L.F.	\$133.00	\$266.000.00	
ERC Riparian Restoration	<user defined="" items<="" td=""><td>18</td><td>Acre</td><td>\$35.000.00</td><td>\$642,792.00</td><td>200 ft on each side of stream</td></user>	18	Acre	\$35.000.00	\$642,792.00	200 ft on each side of stream
						<u>n</u>
	Master Plan Capital Impro	vement Cost Su	nmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$908,792,00	
Subtotal Capital Improvement Costs					\$908,792,00	
Additional Capital Improvement Co	sts					
Dewatering		\$9,087.92	L.S.		\$9,088.00	
Mobilization		5%			\$45,440.00	
Traffic Control		\$22,719.80	L.S.		\$22,720.00	
Utility Coordination/Relocation		\$22,719.80	L.S.		\$22,720.00	
Stormwater Management/Erosion Control		5%			\$45,440.00	
Subtotal Additional Capital Improvement Cos	sts				\$145,408.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$158,130.00	
Legal/Administrative		5%			\$52,710.00	
Contract Admin/Construction Management		10%			\$105,420.00	
Contingency		25%			\$263,550.00	
Subtotal Other Costs					\$579,810.00	
Total Capital Improvement Cost	ts				\$1,634,010.00	
Maste	r Plan Operation and Maintenan	ce Cost Summar	у			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris n	emoval, erosion, tree & weed removal, etc.)	2000	L.F.	\$2.00	\$800.00	
Total Annual Operation and Maintenance Cost						
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$28,000.00				

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MA	STER PLAN COST ESTIMAT									
PROJECT : DRAINAGEWAY :	Boulder Creek MDP - Reach 5 Boulder Creek									
REACH :	5G Boulder County									
REACH ID:	BCM-Reach5G	Jeremy Deischer		DATE :	2015-04-22					
		1			n					
					TOTAL					
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS				
Special Items (User Defined)										
Old bridge removal	<user defined="" items<="" td=""><td>4800</td><td>S.F.</td><td>\$50.00</td><td>\$240,000.00</td><td>120 ft. x 40 ft.</td></user>	4800	S.F.	\$50.00	\$240,000.00	120 ft. x 40 ft.				
180 ft. span bridge	<user defined="" items<="" td=""><td>7200</td><td>S.F.</td><td>\$250.00</td><td>\$1,800,000.00</td><td></td></user>	7200	S.F.	\$250.00	\$1,800,000.00					
	Master Plan Capital Improv	ement Cost Sur	mmary							
Capital Improvement Costs					-					
Pipe Culverts and Storm Drains					\$0.00					
Concrete Box Culverts					\$0.00					
Hydraulic Structures					\$0.00					
Channel Improvements					\$0.00					
Determon water Quality Facilities					\$0.00					
Landscaping and Maintenance Improvements					\$0.00					
Special Items (User Defined)					\$2,040,000,00					
Subtotal Capital Improvement Costs					\$2,040,000,00					
Additional Capital Improvement Co	sts									
Dewatering		\$20,400.00	L.S.		\$20,400.00					
Mobilization		5%			\$102,000.00					
Traffic Control		\$51,000.00	L.S.		\$51,000.00					
Utility Coordination/Relocation		\$51,000.00	L.S.		\$51,000.00					
Stormwater Management/Erosion Control		5%			\$102,000.00					
Subtotal Additional Capital Improvement Co	sts				\$326,400.00					
Land Acquisition Costs										
ROW/Easements					\$0.00					
Subtotal Land Acquisition Costs	Limnzouement Coote)		_		\$0.00					
Other Costs (percentage of Capita	r improvement Costs)	159/			\$254,060,00					
Lengineering		5%			\$354,960.00					
Contract Admin/Construction Management		10%			\$236 640 00					
Contingency		25%			\$591,600,00					
Subtotal Other Costs					\$1,301,520.00					
Total Capital Improvement Cost	s				\$3.667.920.00					
Maste	r Plan Operation and Maintenand	ce Cost Summar	.y							
Description		Quantity	Unit	Unit Cost	Total Annual Cost					
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	40	L.F.	\$2.00	\$16.00					
Total Annual Operation and Ma	intenance Cost				\$16.00					
Effective Interest Rate					1.50%					
Total Operation and Maintenan	ce Costs Over 50 Years	\$560.00								

MAS	]					
	-					
PROJECT :	Boulder Creek MDP - Reach 5					_
DRAINAGEWAT :	Boulder Creek					_
REACH :	5G-100yr					-
JURISDICTION :	Boulder County	Joromy Dojechor		DATE -	2015-04-22	1
REACH ID.	BCm-reach50-100yr	Sereniy Delaciter		DATE .	2013-04-22	<u></u>
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL	LISER COMMENTS
Channel Improvements	1			0.000		
Excavation, Mid Range		14304	C.Y.	\$29.00	\$414.816.00	Fill Required for roadway reconstruction
Special Items (User Defined)	•					
Removal of old 120 ft, bridge	<user defined="" items<="" td=""><td>4800</td><td>S.F.</td><td>\$50.00</td><td>\$240.000.00</td><td>40 ft, width</td></user>	4800	S.F.	\$50.00	\$240.000.00	40 ft, width
220' span bridge	<user defined="" items<="" td=""><td>8800</td><td>S.F.</td><td>\$250.00</td><td>\$2,200,000,00</td><td>40 ft. width</td></user>	8800	S.F.	\$250.00	\$2,200,000,00	40 ft. width
Asphalt Remove and Replace	<user defined="" items<="" td=""><td>6711</td><td>S.Y.</td><td>\$60.00</td><td>\$402,667.00</td><td>1510 ft. of roadway reconstruction</td></user>	6711	S.Y.	\$60.00	\$402,667.00	1510 ft. of roadway reconstruction
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$414,816.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,842,667.00	
Subtotal Capital Improvement Costs					\$3,257,483.00	
Additional Capital Improvement Co	sts					
Dewatering		\$32,574.83	L.S.		\$32,575.00	
Mobilization		5%			\$162.874.00	
Traffic Control		\$81,437.08	L.S.		\$81,437.00	
Utility Coordination/Relocation		\$81,437,08	L.S.		\$81,437,00	
Stormwater Management/Erosion Control		5%			\$162,874.00	
Subtotal Additional Capital Improvement Cos	sts				\$521,197.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)					
Engineering		15%			\$566,802.00	
Legal/Administrative		5%			\$188,934.00	
Contract Admin/Construction Management		10%			\$377,868.00	
Contingency		25%			\$944,670.00	
Subtotal Other Costs		\$2,078,274.00				
Total Capital Improvement Cost	S	\$5,856,954.00				
Maste						
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris n	emoval, erosion, tree & weed removal, etc.)	\$16.00				
Total Annual Operation and Ma	intenance Cost				\$16.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	co Costs Over 50 Vears	\$560.00				

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MAS	1					
						1
PROJECT :	Boulder Creek MDP - Reach 5					
DRAINAGEWAY :	Boulder Creek					
REACH :	5H					-
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach5H	Jeremy Deischer		DATE :	2015-04-22	
		-		1		
DECODUCTION					TOTAL	LIGER COMMENTS
DESCRIPTION		QUANTITY	UNII	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Stream Restoration	<user defined="" items<="" td=""><td>4500</td><td>L.F.</td><td>\$133.00</td><td>\$598,500.00</td><td></td></user>	4500	L.F.	\$133.00	\$598,500.00	
ERC Riparian Restoration	<user defined="" items<="" td=""><td>41</td><td>AC</td><td>\$35,000.00</td><td>\$1,446,281.00</td><td>200 ft. on each side of stream</td></user>	41	AC	\$35,000.00	\$1,446,281.00	200 ft. on each side of stream
	Master Plan Canital Improv	omant Cost Su	mory			
Capital Improvement Costs	master Plan Capital Improv	rement Cost Sur	ninary			
Pine Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,044,781.00	
Subtotal Capital Improvement Costs					\$2,044,781.00	
Additional Capital Improvement Co	sts					
Dewatering		\$20,447.81	L.S.		\$20,448.00	
Mobilization		5%			\$102,239.00	
Traffic Control		\$51,119.53	L.S.		\$51,120.00	
Utility Coordination/Relocation		\$51,119.53	L.S.		\$51,120.00	
Stormwater Management/Erosion Control		5%			\$102,239.00	
Subtotal Additional Capital Improvement Cos	sts				\$327,166.00	
Land Acquisition Costs					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)				\$0.00	
Engineering		15%	[		\$355 792 00	
Legal/Administrative		5%			\$118,597,00	
Contract Admin/Construction Management		10%			\$237,195,00	
Contingency		25%			\$592,987.00	
Subtotal Other Costs					\$1,304,571.00	
Total Capital Improvement Cost	s				\$3,676,518.00	
						•
Maste	r Plan Operation and Maintenand	e Cost Summar	v			
Description	· · · · · · · · · · · · · · · · · · ·	Total Annual Cost				
Channel Maintenance (e.g. sediment & debris n	emoval, erosion, tree & weed removal, etc.)	4500	L.F.	\$2.00	\$1,800.00	
Total Annual Operation and Ma	intenance Cost				\$1,800.00	
Effective Interest Rate					1.50%	
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years	\$62,999.00				

PROJECT:         Booklet Creak           Booklet Creak         Booklet Creak         Booklet Creak         Booklet Creak           Booklet Creak         Booklet Creak         June Creat         TOTAL         USER Commemon           Special Rems (User Defined)         Colstant         L is         Special Rems (User Defined)         USER Commemon           Definit Ingravement Costs         Feasible Treak         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)           Concrete Root Costs         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)           Concrete Root Costs         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)           Concrete Root Costs         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined)           Concrete Root Costs         Special Rems (User Defined)         Special Rems (User Defined)         Special Rems (User Defined) </th <th>MAS</th> <th></th>	MAS						
Booker fores More Result 500           Booker Fo							
DRAMOGENYI II         Bodie Creak           MIRCHYI II         Bodie Courty         DATE : 201504-23           MIRCHYI III IIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	PROJECT :	Boulder Creek MDP - Reach 6					
BACH ::         OL           DURBDOT ON:         BOUGH Contruit         DUR ::         2015 04-22           DESCRIPTION         DUANTITY         UNIT         UNIT COST         COST           Special terms (User Defined)	DRAINAGEWAY :	Boulder Creek					
Multiplication Description         Bodder County         Jurner         Date:         2015-04-22           DESCRIPTION         QUANTITY         UNIT         UNIT         COST         USER COMMENTS           Special lenge	REACH :	6A					
REACH DC         BOM Reaching         Jerrey Delicity         DATE:         (20154)22           DESCRPTION         QUANTITY         UNIT         UNIT         COST         USER COMMENTS           Special lemms (User Defined)	JURISDICTION :	Boulder County					
DESCRPTION         QUANTITY         UNIT         UNIT         TOTAL COST         USER COMMENTS           Special leng (User Defined) Motify Dath for Agains & Hebital Passage        User Defined terms         1         LS         \$250,000,00         \$250,000,00           Master Plan Capital Improvement Costs	REACH ID:	BCM-Reach6A	Jeremy Deischer		DATE :	2015-04-22	
DESCRPTION         QUANTITY         UNIT         UNIT COST         TOTAL COST         USER COMMENTS           Special terms (User Defined)         eUser Defined terms         1         LS         \$200000         \$200000           Child inforcement Costs         eUser Defined terms         1         LS         \$200000         \$200000           Concrete Row Durins         Concrete Row Durins         5000         \$200000         \$200000         \$200000           Concrete Row Durins         Concrete Row Durins         5000         \$200000 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
DESCRIPTION         QUANTITY         UNIT         UNIT         COST         USER COMMENTS           Special Instructions (User Defined) tens         1         LS         \$250,000.0						TOTAL	
Special htms (User Defined)         I         LS.         Special and set many           Mady Defined Again & Hadder Hassage	DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Operation intrins (Service)         Naster Plan Capital Improvement Cost Summary           Capital Improvement Costs         \$200,000         \$250,000.00           Capital Improvement Costs         \$000         \$000           Structure Costs         \$000         \$000           Capital Improvement Costs         \$000         \$000           Structure Costs         \$250,000.00         \$000           Structure Costs         \$250,000.00         \$000           Structure Costs         \$250,000.00         \$000           Additional Copital Improvement Costs         \$250,000         \$000           Structure Costs         \$250,000         \$1000           Additional Phale Improvement Costs         \$250,000         \$1000           Structure Costs         \$250,000         \$1000         \$1000           Contain Phale Costs         \$250,000         \$1000         \$1000           Contain Phale Costs         \$250,000         \$1000         \$1000           Contain Phalon Ph	Special Items (User Defined)						
Description in reading         Consist framework         Consist framework         Reaction of the processing of the process	Modify Ditch for Aquatic & Habitat Passage	Lear Defined Itoms	1	1.5	\$250,000,00	\$250,000,00	
Capital Ingrovement Costs             Summary             Capital Ingrovement Costs             Summary	Moulty Diter for Aquatic & Habitat Fassage		1	L.U.	φ230,000.00	\$230,000.00	
Capital Improvement Costs         State Train Capital Improvement Costs           Optication Records and Starm Data         \$30.00           Control Box Columns         \$30.00           Charnel Increase         \$30.00           Schoold Capital Increase         \$30.00           Subtrata Addition Copital Increase         \$350.000.00           Subtrata Capital Increase         \$350.000.00           Subtrata Addition Copital Increase         \$350.000.00           Subtrata Addition Copital Increase         \$350.000.00           Subtrata Addition Copital Increase         \$350.000.00           Subtrata Addition Costs         \$350.000.00           Subtrata Addition Costs         \$30.00           Contract Capita Increase         \$30.00           Subtrata Addition Costs         \$350.00 </td <td></td> <td>Master Plan Capital Improv</td> <td>voment Cost Su</td> <td>mmary</td> <td></td> <td></td> <td></td>		Master Plan Capital Improv	voment Cost Su	mmary			
See Control & Sec Code         \$0.00           Concrise Bac Code         \$0.00           Mode Size Code         \$0.00           Demonsition Code Size Cod	Capital Improvement Costs	Master Flan Capital Impro	vement cost out	minary			
Add consists         9000           Consists EX Diculars         9000           Statistal Capital Improvement Costs         92000           Consists EX Diculars         92000           Statistal Capital Improvement Costs         92000           Consists EX Diculars         92000           Additional Capital Improvement Costs         92000           Consists EX Diculars         92000           Statistal Capital Improvement Costs         92000           Consisting Control         92000           Statistal Additional Capital Improvement Costs         92000           Statistal Additional Capital Improvement Costs         92000           Statistal Additional Capital Improvement Costs         9000           Costs         92000           Costs (procenting of Capital Improvement Costs         9000           Contrica	Pine Culterte and Storm Draine					\$0.00	
Curcine Solutions         9000           Channel Improvements         9000           Channel Improvements         90.00           Runnokal         90.00           Runnokal         90.00           Special Improvements         90.00           Special Improvements         90.00           Special Improvements         90.00           Special Improvements         90.00           Additional Capital Improvement Costs         9250.000           Additional Capital Improvement Costs         9250.000           Mabitzation         97%           Traffic Control         98.02.00           Ukby Coordination/Relocation         98.250.00           Subtrat Legital Improvement Costs         98.00.00           Subtrat Legital Improvement Costs         98.00.00           Subtrat Legital Improvement Costs         98.250.00           Lind Additional Capital Improvement Costs         98.00.00           Subtrat Land Additional Capital Improvement Costs         98.00.00           Lind Additional Capital Improvement Costs         98.00.00           Lind Addition Costs         98.00.00           Contrast Admini Constauction Management         5%         98.10.00.00           Subtrat Land Aduphilon Costs         98.00.00         98.10.0	Concrete Roy Culverte					\$0.00	
'ydaald         9400           Datwell intyrowennis         \$000           Datwell ontyrowennis         \$000           Annola Intyrowennis         \$000           Candia Landia Landi	Hudraulia Chrushuraa					\$0.00	
Clarit Rid Workings         \$0.00           Rancokis         \$0.00           Rancokis         \$0.00           Carbing and Maintenance Improvements         \$0.00           Special Items (Jase Defined)         \$250.000.00           Additional Ceptal Improvement Costs         \$250.000.00           Mobilization         \$56.250.00         L.S.         \$25.250.00           Taffic Control         \$66.250.00         L.S.         \$6.250.00           Subtrait Additional Ceptal Improvement Costs         \$6.250.00         L.S.         \$6.250.00           Utily Coordination/Relocation         \$6.250.00         L.S.         \$6.250.00           Subtrait Additional Ceptal Improvement Costs         \$40,000.00         \$12.250.00           Coordination/Relocation         \$5%         \$12.250.00         \$25.000           Subtrait Additional Ceptal Improvement Costs         \$0.00         \$22.250.00         \$25.00           Coordination/Relocation         \$5%         \$14.500.00         \$25.00           Subtrait Costs         \$24.000.00         \$27.2500.00         \$20.00	Channel Improvements					\$0.00	
Cuence of the state	Charitier Improvements					\$0.00	
Paintosia         30.00           Special luma (Jano Emprovement Sosts         \$250.000           Additional Ceptal Improvement Costs         \$250.000.00           Mobilization         \$5%         \$52.500.00           Taffe Cond         \$6.250.00         L.S.         \$6.250.00           Subtrait Capital Improvement Costs         \$6.250.00         L.S.         \$6.250.00           Subtrait Additional Ceptal Improvement Costs         \$6.250.00         L.S.         \$6.250.00           Subtrait Land Additional Ceptal Improvement Costs         \$40,000.00         \$12.500.00           Subtrait Land Additional Ceptal Improvement Costs         \$40,000.00         \$12.500.00           Other Costs (percentage of Ceptal Improvement Costs)         \$50.00         \$12.500.00         \$12.500.00           Iggit Administrative         \$54.500.00         \$12.500.00         \$12.500.00         \$12.500.00           Cotter Costs (percentage of Ceptal Improvement Costs)         \$15.500.00         \$12.500.00         \$12.500.00         \$12.500.00         \$12.500.00	Detention/Water Quality Facilities					\$0.00	
Lindbalging and Market entry overnets         50.00         50.00           Social tiers (Market entry)         5250.000.00         5250.000.00           Additional Capital Improvement Costs         5250.000.00         5250.000.00           Development Costs         5250.000.00         5250.000.00           Mobilization         5%         5250.000           Development Costs         58.250.00         LS.         58.250.00           Uity Coordinator/Relocation         59.250.00         LS.         58.250.00           Stortsater Management/Ecosion Control         59.250.00         LS.         58.250.00           Subtatal Additional Capital Improvement Costs         512.200.00         512.200.00           Lind Additional Capital Improvement Costs         50.00         LS.         58.250.00           Subtatal Additional Capital Improvement Costs         510.00         50.00         50.00           Chier Costs (creantage of Capital Improvement Costs)         5%         514.3500.00         50.00           Chier Costs (creantage of Capital Improvement Costs)         572.500.00         50.00         50.00           Chier Costs (Costa Lamin', Costs)         572.500.00         50.00         50.00         50.00           Contral Admin', Costa Lamin', Costs)         572.500.00         50.00	Removals		\$0.00				
Cylcol all mgrowment Costs         \$22,000,00           Additional Capital Improvement Costs         \$22,000,00           Additional Capital Improvement Costs         \$22,000,00           Mobilization         \$5%         \$25,000,00           Mobilization         \$5%         \$12,500,00           Mobilization         \$6,550,00         L.S.         \$6,550,00           Statistic Costs         \$6,550,00         L.S.         \$6,550,00           Subtrast Capital Improvement Costs         \$6,550,00         L.S.         \$6,550,00           Subtrast Capital Improvement Costs         \$6,550,00         L.S.         \$6,550,00           Subtrast Additional Capital Improvement Costs         \$40,000,00         \$12,500,00           Subtrast Additional Capital Improvement Costs         \$40,000,00         \$12,500,00           Subtrast Additional Capital Improvement Costs         \$0,00         \$0,00           Other Costs (percentage of Capital Improvement Costs)         \$0,00         \$14,500,00           Optin Administration         \$9%         \$14,500,00         \$12,500,00           Contingency         \$2%         \$14,500,00         \$22,500,00         \$20,500,00           Subtrast Capital Improvement Costs         \$14,500,00         \$22,500,00         \$20,500,00         \$20,500,00	Landscaping and Maintenance Improvements					\$0.00	
Subtotal Capital improvement Costs         \$240,000.00           Additional Capital improvement Costs         \$250,000           Dewatering         \$2,50,000           Mobilization         \$%           Control         \$8,250,000           Lisk         \$8,250,000           Taffic Control         \$8,250,000           Uiky Coordination/Relocation         \$8,250,000           Stormwater Management/Fosion Control         \$8,250,000           Stormwater Management/Fosion Control         \$9%           Subtotal Additional Capital Improvement Costs         \$8,250,000           Lind Acquisition Costs         \$12,500,00           Subtotal Addition Costs         \$12,500,00           Other Costs (pricentage of Capital Improvement Costs)         \$100           Engineering         \$10%         \$0,00           Other Costs (pricentage of Capital Improvement Costs)         \$14,500,00           Engineering         \$1%         \$14,500,00           Contralt Administrative         \$1%         \$14,500,00           Contral Capital Improvement Costs         \$14,500,00         \$12,500,00           Contralt Administrative         \$14,500,00         \$12,500,00           Contralt Administrative         \$14,500,00         \$12,500,00           T	Special Items (User Defined)					\$250,000.00	
Additional Capital Improvement Losis         \$2,000.0         L.S.         \$2,000.0           Medization         5%         \$12,000.0         \$12,500.00           Medization         \$6,550.00         L.S.         \$6,250.00           Constraints         \$6,250.00         L.S.         \$6,250.00           Subscription         \$6,250.00         L.S.         \$6,250.00           Subscription Control         5%         \$12,500.00           Subscription Control         5%         \$0.00           Subscription Control         50.00         \$0.00           Outring Control (precentage of Capital Improvement Costs)         \$14,500.00         \$0.00           Contract Adminication Management Costs         \$14,500.00         \$12,500.00           Contract Adminication Management Costs         \$12,500.00         \$12,500.00           Subscription         25%         \$13,500.00         \$12,500.00           Contract Other C	Subtotal Capital Improvement Costs					\$250,000.00	
Devidening         \$2,00,00         LS.         \$2,00,00           Medization         5%         \$12,50,00         \$12,50,00           Trafile Control         \$6,250,00         LS.         \$6,250,00         \$6,250,00           Ubity Coordinator/Relocation         \$6,250,00         LS.         \$6,250,00         \$6,250,00           Stormwater Management/Ecosion Control         \$9%         \$12,500,00         \$6,250,00         \$6,250,00           Stormwater Management/Ecosion Control         \$9%         \$12,500,00         \$6,250,00         \$6,250,00           Stormwater Management/Ecosion Control         \$9%         \$12,000,00         \$6,250,00         \$6,250,00           Land Acquisition Cosis         \$100         \$100         \$100,000	Additional Capital Improvement Co	sts					
Madel 2001         5%         \$12,000,00           Madel 2001         LS         \$6,250,00           Lity Cordination/Relocation         \$6,250,00         LS         \$6,250,00           Subtrait Additional Capital Improvement Costs         \$12,000,00         \$12,000,00           Land Adquision Coste         \$40,000,00         \$12,500,00           Subtrait Additional Capital Improvement Costs         \$40,000,00         \$12,500,00           Land Adquision Costs         \$0,00         \$0,000         \$0,000           Subtrait Ind Adquision Costs         \$0,000         \$0,000         \$0,000           Other Costs (percentage of Capital Improvement Costs)         \$0,000         \$0,000         \$0,000           Logid Administrative         \$0,000         \$12,500,000         \$0,000         \$0,000           Contragenerit         \$10,500         \$14,500,000         \$12,500,000 <t< td=""><td>Dewatering</td><td></td><td>\$2,500.00</td><td>L.S.</td><td></td><td>\$2,500.00</td><td></td></t<>	Dewatering		\$2,500.00	L.S.		\$2,500.00	
Ifaile Control         S6.260.00         LS.         S6.260.00           Ubity Contrainton/Relocation         S6.260.00         LS.         S6.260.00           Stormwater Management/Fosion Control         S6         S6.260.00         LS.         S6.260.00           Stormwater Management/Fosion Control         S6         S6.260.00         LS.         S6.260.00           Subtroal Addition/Relocation         S600         LS.         S6.260.00         S6.260.00           Land Acquisition Costs         S0.00         S0.00         S0.00         S0.00           Subtroal Addition Costs         S0.00         S0.00         S0.00         S0.00           Subtroal Addition Costs         S0.00         S0.00         S0.00         S0.00           Subtroal Addition Costs         S0.00         S0.00         S0.00         S0.00           Chrier Costs (percentage of Capital Improvement Costs)         S0.00         S0.00         S0.00           Lagai Administrative         S%         S14.560.00         S0.00         S0.00           Contract Adminicroative Management         10%         S14.560.00         S0.00         S0.00         S0.00           Total Capital Improvement Costs         \$14.950.00         \$12.900.00         S0.00         S0.00	Mobilization		5%			\$12,500.00	
Calify Control Networkshow         SR.2000         Lbs.         SR.2000           Subtrait Additional Capital Improvement Costs         5%         \$\$12,000           Land Additional Capital Improvement Costs         \$40,000.00         \$12,000           Land Additional Capital Improvement Costs         \$40,000.00         \$12,000           Subtrait Additional Capital Improvement Costs         \$20,000         \$20,000           Other Costs (percentage of Capital Improvement Costs)         \$20,000         \$20,000           Other Costs (percentage of Capital Improvement Costs)         \$40,000.00         \$20,000           Contrad Administrative         \$9%         \$43,500.00         \$14,500.00           Contrad Administrative         \$9%         \$14,500.00         \$14,500.00           Contrad Administrative         \$9%         \$14,500.00         \$12,000.00           Contrad Administrative         \$9%         \$14,500.00         \$12,000.00           Contrad Administrative         \$9%         \$14,500.00         \$12,000.00           Contradiction Menagement         10%         \$22,000.00         \$12,000.00           Contradiction Costs         \$14,490,500.00         \$12,000.00         \$12,000.00           Contradiction Costs         \$14,490,500.00         \$12,000.00         \$12,000.00 <td>Iraffic Control</td> <td></td> <td>\$6,250.00</td> <td>L.S.</td> <td></td> <td>\$6,250.00</td> <td></td>	Iraffic Control		\$6,250.00	L.S.		\$6,250.00	
Submit Natriagement Foods Control         Style         S12,000,00           Land Acquisition Costs         S40,000,00         S40,000,00           Land Acquisition Costs         \$0,00         S40,000,00           Subtact Addition Costs         \$0,00         S40,000,00           Subtact Addition Costs         \$0,00         S40,000,00           Other Costs (percentage of Capital Improvement Costs)         \$0,00         S43,500,00           Contract Administrative         \$15%         \$43,500,00           Legal Administrative         \$15%         \$43,500,00           Contract Administrative         \$15%         \$43,500,00           Contract Administrative         \$14,500,00         S00,00           Contract Administrative         \$14,500,00         \$25,000,00           Contract Administrative         \$14,500,00         \$25,000,00           Contract Administrative         \$15,550,000         \$100           Total Capital Improvement Costs         \$14,9500,000         \$100           Master Plan Operation and Maintenance Cost Summary         \$14,9500,000         \$122,000           Master Plan Operation and Maintenance Cost Summary         \$142,000         \$122,000           Cotal Annual Operation and Maintenance Cost         \$1         \$1         \$122,000 <tr< td=""><td>Utility Coordination/Relocation</td><td></td><td>\$6,250.00</td><td>L.S.</td><td></td><td>\$6,250.00</td><td></td></tr<>	Utility Coordination/Relocation		\$6,250.00	L.S.		\$6,250.00	
Subtotal Additional Capital Improvement Costs         \$40,000.00           Land Additional Capital Improvement Costs         \$0.00           Other Costs (pricentage of Capital Improvement Costs)         \$0.00           Other Costs (pricentage of Capital Improvement Costs)         \$0.00           Contract Administrative         \$19%           Contract Administrative         \$14,000.00           Contract Administrative         \$14,500.00           Contract Administrative         \$12,500.00           Contract Administrative         \$14,49,500.00           Contract Administrative         \$14,49,500.00           Subtotal Land Advisor         \$44,9,500.00           Contract Administrative         \$14,49,500.00           Contract Administrative         \$14,49,500.00           Contract Administrative         \$14,49,500.00           Contract Administrative         \$12,000	Stormwater Management/Erosion Control		5%			\$12,500.00	
Land Acquisition Costs         \$0.00           Solutional Land Acquisition Costs         \$0.00           Other Society (percentage of Capital Improvement Costs)         \$0.00           Costs (percentage of Capital Improvement Costs)         \$43,500.00           Lagal Administrative         \$9%         \$14,500.00           Contract Agmine Construction Management         10%         \$29,000.00           Total Capital Improvement Costs         \$19,9500.00         \$1000           Total Capital Improvement Costs         \$\$449,500.00         \$1000           Master Plan Operation and Maintenance Cost Summary         \$\$449,500.00         \$12000           Percentary Agmine Agement (ag. debris removal, erosion structural repairs, etc.)         1         EA         \$800.00         \$120.00           Total Annual Operation and Maintenance Cost         Y         Y         Y         Y         Y           Effective Interes Rate         1.50%         1.50%         Y         Y         Y<	Subtotal Additional Capital Improvement Cos	sts				\$40,000.00	
RQW/Examents         \$0.00           Other Costs (procentage of Capital Improvement Costs)         \$0.00           Other Costs (procentage of Capital Improvement Costs)         \$43,500.00           Logal Administrative         \$5%         \$14,500.00           Contract Adminicrative         \$5%         \$14,500.00           Contract Adminicrative         \$5%         \$14,500.00           Contract Adminicrative         \$5%         \$14,500.00           Contract Adminicrative         \$72,500.00         \$289,000.00           Contract Adminicrative         \$72,500.00         \$100           Total Capital Improvement Costs         \$149,500.00         \$100           Master Plan Operation and Maintenance Cost Summary         \$149,500.00         \$100           Pescription         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraulc Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         1         EA         \$008.00         \$122.00           Effective Interest Raie          \$122.00         \$122.00         \$122.00	Land Acquisition Costs						
Solution Land Acquisition Costs         50.00           Other Costs (percentage of Capital Improvement Costs)         5%           Engineering LagrAdministrative         5%         \$43,500.00           Contragt AdminiStrative         5%         \$141,600.00           Contragt AdminiStrative         5%         \$22,000.00           Contragt AdminiStrative         25%         \$22,000.00           Contingency         25%         \$22,000.00           Solutional Other Costs         \$15% 500.00           Total Capital Improvement Costs         \$15% 500.00           Master Plan Operation and Maintenance Cost Summary         \$44,9,500.00           Pescription         Quantity         Unit         Unit Cost           Hydraule Structure Maintenance (eg. debris removal, erosion, structural repairs, etc.)         1         EA         \$808.00           Total Annual Operation and Maintenance Cost         \$122.00         \$122.00         \$122.00           Effective Interest Rate         1.50%         \$1,50%         \$230.00	ROW/Easements					\$0.00	
Other Cests (procentage of Capital Improvement Costs)         15%         \$43,500.00           LegalAdministrative         5%         \$14,500.00           Confrance (Aministrative)         5%         \$14,500.00           Confrance (Aministrative)         5%         \$14,500.00           Confrance (Aministrative)         5%         \$28,000.00           Confrance (Aministrative)         5%         \$72,500.00           Subtoal Other Costs         \$195,500.00         \$100           Total Capital Improvement Costs         \$149,500.00         \$100           Master Plan Operation and Maintenance Cost Summary         \$149,500.00         \$100           Point Costs         \$449,500.00         \$100         \$100           Confrance (a.g. debris removal, aroan, structural repairs, etc.)         1         EA         \$808.00         \$122.00           Effective Interest Rate          \$122.00         \$122.00         \$122.00           Effective Interest Rate          \$1,50%         \$1,50%         \$1,50%	Subtotal Land Acquisition Costs					\$0.00	
Engineering         15%         \$43,500.00           LegalAdministrative         5%         \$154,500.00           Contract Admini/Construction Management         10%         \$29,000.00           Contract Admini/Construction Management         25%         \$154,500.00           Subtotal Other Costs         \$159,500.00         \$72,500.00           Subtotal Other Costs         \$159,500.00         \$159,500.00           Total Capital Improvement Costs         \$159,500.00         \$159,500.00           Master Plan Operation and Maintenance Cost Summary         \$449,500.00         \$159,500.00           Vidraule Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         1         Unit         Unit         Cost           Total Annual Operation and Maintenance Cost         \$122.00         \$122.00         \$122.00         \$122.00           Effective Interest Rate         1.55%         \$1.55%         \$1.55%         \$1.55%         \$1.55%	Other Costs (percentage of Capita	Improvement Costs)					
Logal Annustrative         5%         \$14,500.00           Confingency         10%         \$29,000.00           Confingency         25%         \$72,500.00           Subtotal Other Costs         \$14,550.00         \$72,500.00           Total Capital Improvement Costs         \$149,500.00         \$72,500.00           Master Plan Operation and Maintenance Cost Summary         \$449,500.00         \$72,500.00           Description         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraule Structure Maintenance (a, debris removal, erosion, structural repairs, etc.)         1         EA         \$608.00         \$122.00           Effective Interest Rate          \$15,500.00         \$122.00         \$122.00         \$122.00           Effective Interest Rate          \$1,50%         \$1,50%         \$1,50%         \$1,50%	Engineering		15%			\$43,500.00	
Contract AdminiConstruction Management     10%     \$28,000.00       Contingency     25%     \$159,500.00       Subtotal Other Costs     \$159,500.00       Total Capital Improvement Costs     \$1449,500.00       Master Plan Operation and Maintenance Cost Summary     \$449,500.00       Pescription     Quantity     Unit     Unit Cost       Total Annual Operation and Maintenance Cost     \$122.00       Total Annual Operation and Maintenance Cost     \$122.00       Effective Interest Rate     1.50%       Total Operation and Maintenance Cost Over 50 Years     \$23,000	Legal/Administrative		5%			\$14,500.00	
Contingency     25%     \$72,500,00       Total Capital Improvement Costs     \$159,500,00       Master Plan Operation and Maintenance Cost Summary     \$449,500,00       Description     Quantity     Unit     Unit Cost       Total Annual Operation and Maintenance Cost Summary     1     EA     \$200,00       Total Annual Operation and Maintenance Cost     \$122,00     \$122,00       Total Annual Operation and Maintenance Cost     \$122,00     \$122,00       Effective Interest Rate     1,50%     1,50%	Contract Admin/Construction Management		10%			\$29,000.00	
Subtrat Other Costs Status Sta	Contingency		25%			\$72,500.00	
Master Plan Operation and Maintenance Cost Summary     Value       Description     Quantity     Unit     Unit Cost       Total Annual Operation and Maintenance Cost     1     EA       State of the intervise Rate     \$122.00       Effective Interest Rate     1.55%       Total Annual Operation and Maintenance Cost Summary	Subtotal Other Costs					\$159,500.00	
Master Plan Operation and Maintenance Cost Summary           Description         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraulc Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         1         EA         \$008.00         \$122.00           Total Annual Operation and Maintenance Cost          \$122.00         \$1.50%           Effective Interest Rate          1.50%         \$1.200	Total Capital Improvement Cost	S	\$449,500.00				
Master Plan Operation and Maintenance Cost Summary           Description         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraule Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         1         EA         \$\$08.00         \$\$122.00           Total Annual Operation and Maintenance Cost         \$\$122.00         \$\$122.00         \$\$122.00           Effective Interest Rate         \$\$1,50%         \$\$122.00         \$\$122.00			·				
Description         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraule Structure Maintenance (a.g. debris removal, erosion, structural repairs, etc.)         1         EA         \$608.00         \$122.00           Total Annual Operation and Maintenance Cost         \$122.00         \$122.00         \$122.00           Effective Interest Rate         \$1,50%         \$1,50%	Maste						
Hydraule Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)     1     EA     \$608.00     \$122.00       Total Annual Operation and Maintenance Cost     \$122.00       Effective Interest Rate     1.50%       Total Operation and Cost     \$27.00	Description	• • • •	Quantity	Unit	Unit Cost	Total Annual Cost	
Total Annual Operation and Maintenance Cost     \$122.00       Effective Interest Rate     1.50%       Total Operation and Maintenance Costs Duor 50 Years     \$\$270.00	Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Effective Interest Rate  Effective Interest Rate  1.50%  Control Operation and Maintenance Costs Over 50 Years  K 270 00  K 27	Total Annual Operation and Maintenance Cost						
Total Operation and Maintenance Costs Over 50 Years							
	Total Operation and Maintonan	co Costs Over 50 Vears				\$4 270.00	

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MA	STER PLAN COST ESTIMAT	E FOR INDIVI	IDUAL RE	ACH		
PROJECT : DRAINAGEWAY :	Boulder Creek MDP - Reach 6 Boulder Creek					
JURISDICTION	Boulder County					-
REACH ID:	BCM-Reach6B	Jeremy Deischer		DATE :	2015-04-22	
				•		
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
180 ft. span bridge at 75th St.	<user defined="" items<="" td=""><td>7200</td><td>S.F.</td><td>\$250.00</td><td>\$1,800,000.00</td><td>40 ft width at 75th St.</td></user>	7200	S.F.	\$250.00	\$1,800,000.00	40 ft width at 75th St.
Old bridge removal	<user defined="" items<="" td=""><td>4400</td><td>S.F.</td><td>\$50.00</td><td>\$220,000.00</td><td>110 x 40 ft</td></user>	4400	S.F.	\$50.00	\$220,000.00	110 x 40 ft
	Master Plan Capital Improv	vement Cost Sui	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,020,000.00	
Subtotal Capital Improvement Costs	-				\$2,020,000.00	
Additional Capital Improvement Co	STS	\$20,200,00	1.6		\$20,200,00	
Mobilization		\$20,200.00 5%	L.U.		\$101.000.00	
Traffic Control		\$50,500,00	1.5		\$50,500,00	
Utility Coordination/Relocation		\$50,500.00	1.5		\$50,500.00	
Stormwater Management/Erosion Control		5%	2.0.		\$101.000.00	
Subtotal Additional Capital Improvement Cos	sts				\$323,200.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)					
Engineering		15%			\$351,480.00	
Legal/Administrative		5%			\$117,160.00	
Contract Admin/Construction Management		10%			\$234,320.00	
Contingency		25%			\$585,800.00	
Subtotal Other Costs					\$1,288,760.00	
Total Capital Improvement Cost	S	\$3,631,960.00				
Maste	r Plan Operation and Maintenan					
Description	por anon and maintenant					
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	40	L.F.	\$2.00	\$16.00	
Total Annual Operation and Maintenance Cost						
Effective Interest Rate					1.50%	
<b>Total Operation and Maintenan</b>	ce Costs Over 50 Years				\$560.00	

MAS	]					
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PROJECT :	Boulder Creek MDP - Reach 6	_				
DRAINAGEWAT :	Boulder Creek					_
REACH :	6B-100yr Beulder County					-
JURISDICTION :	Boulder County BCM-Roach6R-100vr	Jeremy Deischer		DATE -	2015-04-22	1
REACH ID.	BCM-Reaction-Todyr	Serenny Deischer		DATE .	2013-04-22	<u></u>
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Excavation, Mid Range		7242	C.Y.	\$29.00	\$210,018.00	Fill required for roadway improvement
Special Items (User Defined)						
180 ft span bridge at 75th St.	<user defined="" items<="" td=""><td>7200</td><td>S.F.</td><td>\$250.00</td><td>\$1,800,000.00</td><td>40 ft. width at 75th</td></user>	7200	S.F.	\$250.00	\$1,800,000.00	40 ft. width at 75th
Remove and Replace Asphalt	<user defined="" items<="" td=""><td>7333</td><td>S.Y.</td><td>\$60.00</td><td>\$440,000.00</td><td>1650 feet of roadway reconstruction ( South Side)</td></user>	7333	S.Y.	\$60.00	\$440,000.00	1650 feet of roadway reconstruction ( South Side)
Old bridge removal	<user defined="" items<="" td=""><td>4400</td><td>S.F.</td><td>\$50.00</td><td>\$220,000.00</td><td>110 ft x 40 ft</td></user>	4400	S.F.	\$50.00	\$220,000.00	110 ft x 40 ft
C						
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$210.018.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,460,000.00	
Subtotal Capital Improvement Costs					\$2,670,018.00	
Additional Capital Improvement Co	sts					
Dewatering		\$26,700,18	L.S.		\$26,700.00	
Mobilization		5%			\$133,501,00	
Traffic Control		\$66,750.45	L.S.		\$66,750.00	
Utility Coordination/Relocation		\$66,750,45	L.S.		\$66,750.00	
Stormwater Management/Erosion Control		5%			\$133,501.00	
Subtotal Additional Capital Improvement Cos	ts				\$427.202.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$464,583.00	
Legal/Administrative		5%			\$154,861.00	
Contract Admin/Construction Management		10%			\$309,722.00	
Contingency		25%			\$774,305.00	
Subtotal Other Costs					\$1,703,471.00	
Total Capital Improvement Cost	S	\$4,800,691.00				
Maste	Plan Operation and Maintenand	ce Cost Summar	v			
maater Fran Operation and manteriance Cost outning /						
Channel Maintenance (e.g. sediment & debris re	moval, erosion, tree & weed removal, etc.)	40	L.F.	\$2.00	\$16.00	
Total Annual Operation and Ma	intenance Cost		•		\$16.00	
Effective Interest Pale					1.50%	
Total Operation and Maintenan	Conto Over EO Venno	£500.00				
LUIAL UDERATION AND WAINTENAN	E GUSIS UVELOU TEALS				2000 000	

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MAS						
PROJECT :	Boulder Creek MDP - Reach 6					
DRAINAGEWAY :	Boulder Creek					
REACH :	6C					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach6C	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
Riverside spillway	<user defined="" items<="" td=""><td>4</td><td>L.S.</td><td>\$225,000,00</td><td>\$900.000.00</td><td></td></user>	4	L.S.	\$225,000,00	\$900.000.00	
	Master Plan Capital Improv	ement Cost Su	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$900.000.00	
Subtotal Capital Improvement Costs					\$900.000.00	
Additional Capital Improvement Co	sts					
Dewatering		\$9,000,00	LS		\$9,000,00	
Mobilization		5%			\$45,000.00	
Traffic Control		\$22,500.00	L.S.		\$22,500.00	
Utility Coordination/Relocation		\$22,500.00	L.S.		\$22,500.00	
Stormwater Management/Erosion Control		5%			\$45,000.00	
Subtotal Additional Capital Improvement Cos	sts				\$144.000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)				10.00	
Engineering		15%			\$156,600,00	
Legal/Administrative		5%			\$52,200,00	
Contract Admin/Construction Management		10%			\$104 400.00	
Contingency		25%			\$261,000.00	
Subtotal Other Costs						
Total Capital Improvement Costs						
Maste	r Plan Operation and Maintenand					
Description Quantity Unit Unit Cost						
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	4	EA	\$608.00	\$486.00	
Total Annual Operation and Ma	intenance Cost				\$486.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

MAS	STER PLAN COST ESTIMA	TE FOR INDIV	IDUAL RE	ACH		
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7A					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7A	Jeremy Deischer		DATE :	2015-04-22	
			r			
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)		1				
Riverside Soillway	<i defined="" iser="" items<="" td=""><td>4</td><td>15</td><td>\$225,000,00</td><td>\$900.000.00</td><td></td></i>	4	15	\$225,000,00	\$900.000.00	
Lateral Spillway	<user defined="" items<="" td=""><td>3</td><td>15</td><td>\$225,000.00</td><td>\$675,000.00</td><td></td></user>	3	15	\$225,000.00	\$675,000.00	
				+	********	
	Master Plan Capital Impr	ovement Cost Su	mmary			
Capital Improvement Costs	master i fall Capital Inpl	ovement Cost Su	ininai y			
Pipe Culverts and Storm Drains					\$0.00	
Concrete Roy Culverte					\$0.00	
Hudraulic Structures					\$0.00	
Chapped Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Berrovals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,575,000,00	
Subtotal Capital Improvement Costs					\$1,575,000,00	
Additional Capital Improvement Co	sts				**,***,******	
Dewatering		\$15,750.00	L.S.		\$15,750.00	
Mobilization		5%			\$78,750.00	
Traffic Control		\$39.375.00	L.S.		\$39.375.00	
Utility Coordination/Relocation		\$39.375.00	L.S.		\$39.375.00	
Stormwater Management/Erosion Control		5%			\$78,750.00	
Subtotal Additional Capital Improvement Cos	sts				\$252,000,00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$274,050.00	
Legal/Administrative		5%			\$91,350.00	
Contract Admin/Construction Management		10%			\$182,700.00	
Contingency		25%			\$456,750.00	
Subtotal Other Costs						
Total Capital Improvement Costs						
Maste	r Plan Operation and Maintena					
Description		Total Annual Cost				
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structural repairs, etc.)	7	EA	\$608.00	\$851.00	
Total Annual Operation and Ma	intenance Cost				\$851.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years					\$29,785.00	

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PROLECT:         Bodder Creek MDP - Reach 7           Brack MDMI         Bodder Creek         Bodder Creek           Machenit         Bodder Creek         Bodder Creek           Machenit         Bodder Creek         Machenit         Machenit           Backer Band MDMI         Jurn I         UNIT         UNIT Cost         COst         USER COMMENTS           Special Items (User Defined)	MAS	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH								
Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Diff : 1019412         Diff : 101942           Bader Creek MD : Reads 7         Diff : 101942         Diff : 101942           Bader Creek MD : Reads 7         Diff : 101942         Diff : 101942         Diff : 101942           Bader Creek MD : Reads 7         Diff : 101942         Diff : 101942         Diff : 101942           Bader Creek MD : Reads 7         Diff : 101942         Diff : 101942         Diff : 101942           Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7         Bader Creek MD : Reads 7           Bader Creek MD : Read Reads 7         Bader Creek										
DRAWLEWY         Bodie Creak           7         7           1,000,00000         10000000000           1000000000000000000000000000000000000	PROJECT :	Boulder Creek MDP - Reach 7								
BLCH:         78           URBOUCH:         BODE / Second           DESCRPTON         OUANTITY         UNIT         OUNIT COST         DISE           Special         Outer / Second         Second         Second         Second           Special         Outer / Second         Second         Second         Second         Second           Special         Second         Seco	DRAINAGEWAY :	Boulder Creek								
Mitsion is diversed output         Date:         2016-22           DESCRPTION         QUANTITY         UNIT         COST         USER COMMENTS           Special lens (User Defined)	REACH :	7B								
RECH ID         BOM-Reach78         Jerrey Deach         DATE:         2019-04-22           DESCRPTION         QUANTTY         UNIT         UNIT COST         TOTAL           Special letms (User Defined)	JURISDICTION :	Boulder County								
DESCRIPTION         QUANTITY         UNIT         UNIT COST         TOTAL COST         USER COMMENTS           Special terms (User Defined) term Spike	REACH ID:	BCM-Reach7B	Jeremy Deischer		DATE :	2015-04-22				
DESCRIPTION         QUANTITY         UNIT         UNIT COST         TOTAL COST         USER COMMENTS           Special berns (User Optined)         5         125 000.00         125000.00         125000.00           Farraite Spike         cUser Defined Items         5         125000.00         545000.00           Farraite Spike         cUser Defined Items         2         1.8         525000.00         545000.00           Farraite Spike         cUser Defined Items         2         1.8         525000.00         545000.00           Concrete Soc Codes         Soc Codes         Soc Codes         500.00         545000.00         545000.00           Concrete Soc Codes         So	r									
DESCRIPTION         QUANTITY         UNIT         COST         USER COMMENTS           Special Issuing         Image Defined)         5         LS         5220.00.0         \$112.00.00.0           Larget Spinny         Image Defined Items         2         LS         5220.00.0         \$112.00.00.0           Larget Spinny         Image Defined Items         2         LS         5220.00.0         \$1490.00.00.0           Concerns Bor Coders						TOTAL				
Special terms (User Defined)         Image: Special terms (User Defined terms)         S         LS         Special Spinus           Terms Spinus         eUser Defined terms         2         LS         Special Spinus         Status (Spinus)           Carbon Spinus         2         LS         Special Spinus         Status (Spinus)         Status (Spinus)           Carbon Spinus         Spinus         Spinus         Spinus         Spinus	DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS			
State Spillwig         c—User Defined herms         0         LS         S225.00.00         S1,125.00.00           Liss         S225.00.00         S40.00.00         S40.00.00           Master Plan Capital Improvement Costs         S         S00.00         S40.00.00           Concerts Box Cubers         S00.00         S40.00.00         S40.00.00           Concerts Box Cubers         S00.00         S00.00         S40.00           Concerts Box Cubers         S00.00         S00.00         S60.00           Charan of States         S0.00         S00.00         S60.00           States         S1.975.000         L.S         S1.975.000           States         S1.975.000         L.S         S1.975.000         S1.975.000           States         S1.975.000         L.S         S1.975.000         S1.975.000           States         S1.975.000         L.S         S1.975.000         S1.975.000	Special Items (User Defined)									
Learnel Spikey         cUser Defined terms         2         LS         \$220,000.00         \$460,000.00           Master Plan Capital Improvement Cost Summary         Summary         Summary         Summary           Cebral Incomment Costs         Summary         Summary         Summary           Cebral Incomment Costs         Summary         Summary         Summary           Ope Charts and Som Data         Summary         Summary         Summary         Summary           Ope Charts and Som Data         Summary         Summary         Summary         Summary         Summary           Ope Charts and Som Data         Summary         Summary         Summary         Summary         Summary         Summary           Ope Charts and Som Data         Summary         Summary         Summary         Summary         Summary         Summary           Summary         Summary         Summary         Summary         Summary         Summary         Summary <thsummary< th="">         Summary           &lt;</thsummary<>	Riverside Spillway	<user defined="" items<="" td=""><td>5</td><td>LS</td><td>\$225,000,00</td><td>\$1,125,000.00</td><td></td></user>	5	LS	\$225,000,00	\$1,125,000.00				
Master Plan Capital Improvement Cost Summary         Stock           Capital Improvement Costs         \$0.00           Concrete Bar CAders         \$0.00           Charter Improvements         \$0.00           Charter Improvements         \$0.00           Charter Improvements         \$0.00           Barroela         \$0.00           Concrete Advection         \$0.00           Special Imm (Live Defined)         \$1.575.000.00           Special Immovement Costs         \$1.575.000.00           Additional Capital Improvement Costs         \$1.575.000.00           Additional Capital Improvement Costs         \$1.575.000.00           Matter Control         \$28.375.00         L.S.           Taffe Control         \$28.375.00         L.S.           Subtrait Indegraphing Provement Costs         \$28.375.00         L.S.           Subtrait Indegraphing Provement Costs         \$28.200.00         \$28.200.00           Land Additional Capital Improvement Costs         \$28.200.00         \$28.200.00           Land Additional Capital Improvement Costs         \$28.200.00<	Lateral Spillway	<user defined="" items<="" td=""><td>2</td><td>LS</td><td>\$225,000.00</td><td>\$450,000.00</td><td></td></user>	2	LS	\$225,000.00	\$450,000.00				
Master Plan Capital Improvement Cost Summary         Subsection           Pape Came and Some Data's         \$0.00           Concerts Born Data's         \$0.00           Concerts Pape Came and Some Data's         \$0.00           Concerts Pape Came and Some Data's         \$0.00           Concerts Pape Came and Some Data's         \$0.00           Concerts Pape Came and Maintenance Concerts         \$0.00           Concerts Data Maintenance Concerts         \$0.00           Concerts Data Maintenance Concert         \$0.00           Submain Concerts         \$1575000.00           Concerts Data Maintenance Concert         \$1575000.00           Concerts Data Maintenance Concerts         \$1575000.00           Concerts Data Maintenance Concert         \$9.00           Concerts Data Maintenance Concert         \$9.00           Concerts Data Maintenance Concert         \$9.00           Submaint Addition Concert         \$9.00	<u> </u>									
Capital Ingresement Costs         50.00           Concrete Bax Cuberts         50.00           Concrete Bax Cuberts         50.00           Charters and Storm Daries         50.00           Concrete Bax Cuberts         50.00           Charters and Storm Daries         50.00           Charters and Lingrovements         50.00           Detention/Vitar Cuber Storm Daries         50.00           Remotab         50.00           Andreaging and Martenance Ingrovements         50.00           Special Interg (User Defined)         \$1.575.00.00           Additional Capital Ingrovement Costs         \$1.575.00.00           Additional Capital Ingrovement Costs         \$1.575.00.00           Mobization         550.375.00         L.S.           Tarlie Cortol         \$50.375.00         L.S.           Stormatic Margement Ficion Control         \$50.00         Stormatic Margement Ficion Control           Stormatic Margement Ficion Control         \$50.00         Stormatic Margement Ficion Control           Stormatic Margement Ficion		Master Plan Capital Improv	ement Cost Sur	nmarv						
Pipe Calers and Storn Drains         \$0.00           Concrete Box Cheen's         \$0.00           Hydrake's Structures         \$0.00           Channel Ingrovements         \$0.00           Detention/Vater CaleRy Facilities         \$0.00           Bernovids         \$0.00           Concrete Box Cheening         \$0.00           Concrete Box Cheening         \$0.00           Concrete Box Cheening         \$0.00           Concrete Box Cheening         \$0.00           Subtort CaleRy Facilities         \$0.00           Subtort Addition Cheening         \$15,750,000           Moltization         \$9.00         \$15,750,000           Concret Detending Pace Cheening         \$9.00         \$15,750,000           Subtort Addition Pace Cheening         \$9.00         \$15,750,000           Subtort Addition Cheening         \$9.00         \$15,750,000           Subtort Addition Cheening         \$9.00         \$15,750,000           Subtort Addition Cheening         \$9.00         \$15,750,000           Subtort Add	Capital Improvement Costs									
Concrete Box Cuterts         \$0.00           Charenel Improvements         \$0.00           Charenel Improvements         \$0.00           Removals         \$0.00           Removals         \$0.00           Special Improvements         \$0.00           Special Improvement Costs         \$0.00           Subtratt Capital Improvement Costs         \$1.575.000.00           Subtratt Advinut Costs         \$1.575.000.00           Butter Cost Canterd         \$2.575.00.00           Subtratt Advinut Costs         \$1.575.000.00           Subtratt Advinut Costs         \$1.575.000.00           Subtratt Advinut Costs         \$2.500.00           Subtratt Advinut Costs         \$2.570.00.00           Conter Costs (porternisting of Capital Improvement Costs)         \$2.74.050.00           Subtrat	Pipe Culverts and Storm Drains					\$0.00				
hydraulic Structures         90.00           Othernel Ingrovements         90.00           Detention Water Casily Facilities         90.00           Bernovalis         90.00           Control Ingrovements         90.00           Detention Vater Casily Facilities         90.00           Subtotal Capital Ingrovement Costs         91.075.000.00           Subtotal Capital Ingrovement Costs         91.975.000.00           Additional Capital Ingrovement Costs         91.975.000.00           Additional Capital Ingrovement Costs         91.975.000.00           Detenting         91.975.000.00           Mobization         95.9         95.975.000.00           Tarific Cortol         95.9         95.975.000.00           Control Control         95.9         95.975.000.00           Subtotal Capital Ingrovement Costs         95.9         95.975.000.00           Subtotal Capital Ingrovement Costs         95.975.000.00         95.975.000.00           Contred Control Control         95.975.000.00 <td< td=""><td>Concrete Box Culverts</td><td></td><td></td><td></td><td></td><td>\$0.00</td><td></td></td<>	Concrete Box Culverts					\$0.00				
Channel Improvements DetentionValue Cably Facilities Bernovals Be	Hydraulic Structures					\$0.00				
Detention/Water Casily Facilities         \$30.00           Bernovalie         \$30.00           Bernovalies         \$30.00           Bernovalies         \$30.00           Subtrati Capital Improvement Costs         \$15,750.00           Subtrati Capital Improvement Costs         \$15,750.00           Deventering         \$15,750.00           Deventering         \$15,750.00           Deventering         \$15,750.00           Deventering         \$15,750.00           Mobization         \$5%         \$15,750.00           Tarlic Corted         \$38,375.00         L.S.         \$38,375.00           Subtrati Additional Capital Improvement Costs         \$38,375.00         L.S.         \$38,375.00           Subtrati Additional Control         \$38,375.00         L.S.         \$38,375.00           Subtrati Additional Capital Improvement Costs         \$38,375.00         L.S.         \$38,375.00           Subtrati Additional Capital Improvement Costs         \$38,375.00         Subtrati Additional Capital Improvement Costs         \$38,375.00           Subtrati Additional Capital Improvement Costs         \$38,375.00         Subtrati Additional Capital Improvement Costs         \$38,375.00           Cotter Costs (Percentage of Capital Improvement Costs)         \$50.00         \$38,350.00 <td< td=""><td>Channel Improvements</td><td></td><td></td><td></td><td></td><td>\$0.00</td><td></td></td<>	Channel Improvements					\$0.00				
Removals         30.00           Landscaping and Maintenance Improvements         \$0.00           Special Iters (Mar Defined)         \$1,575.000.00           Subtotal Capital Improvement Costs         \$1,575.000.00           Advisional Capital Improvement Costs         \$1,575.000.00           Devisitional Capital Improvement Costs         \$15,750.00           Devisitional Capital Improvement Costs         \$15,750.00           Link Coordinator/Relacion         \$5%         \$15,750.00           Unity Coordinator/Relacion         \$39,375.00         L.S.         \$39,375.00           Stormater Management/Erosion Control         \$39,375.00         L.S.         \$39,375.00           Subtotal Advisional Capital Improvement Costs         \$78,750.00         \$78,750.00           Land Acquisition Costs         \$39,375.00         L.S.         \$39,375.00           Subtotal Advisition Costs         \$30,375.00         L.S.         \$39,375.00           Subtotal Land Acquisition Costs         \$30.00         \$30,00         \$30,00           Subtotal Land Acquisition Costs         \$0.00         \$274,050.00         \$30,00           Contract Administrative         \$30,00         \$30,300         \$30,00           Contract Administrative         \$30,400         \$30,300         \$30,00	Detention/Water Quality Facilities					\$0.00				
Landscaping and Maintenance (Improvements)         \$0.00           Special Iters (User Defined)         \$1,575.00.00           Subtoal Capital Improvement Costs         \$1,575.00.00           Additional Capital Improvement Costs         \$1,575.00.00           Additional Capital Improvement Costs         \$1,575.00.00           India Corrial         \$15,750.00           India Corrial         \$15,750.00           India Corrial         \$15,750.00           India Corrial         \$15,750.00           India Corrial         \$30,375.00           Lass         \$38,375.00           Subtoal Corrial Additional Capital Improvement Costs         \$37,875.00           Subtoal Additional Capital Improvement Costs         \$38,375.00           Subtoal India Capital Improvement Costs         \$38,375.00           Subtoal Land Acquisition Costs         \$38,375.00           Other Costs (Provement Costs)         \$30.00           Other Costs (Provement Costs)         \$30.00           Outrat Administrative         \$5%           Contrad Administrative         \$39,375.00           Contrad Administrative         \$31,375.00           Contrad Administrative         \$31,375.00           Contrad Administrative         \$31,375.00           Contrad Administrative	Removals					\$0.00				
Special terrs (Liker Defined)         \$1,875,000.00           Additional Capital Improvement Costs         \$1,875,000.00           Mobilizational Capital Improvement Costs         \$1,875,000.00           Mobilization         \$15,750,000.00           Special Modilion         \$15,750,000.00           Subscription         \$15,750,000.00           Subscription         \$15,750,000.00           Subscription         \$39,375.00           Subscription         \$252,000.00           Subscription         \$252,000.00           Cotter Costs (preferration Costs)         \$20.00           Cotter Costs (preferration Costs)         \$20.00           Cotter Costs (preferration Costs)         \$27,405.00           Cotter Costs (preferration Management Costs)         \$27,405.00           Subscription <td< td=""><td>Landscaping and Maintenance Improvements</td><td></td><td></td><td></td><td></td><td>\$0.00</td><td></td></td<>	Landscaping and Maintenance Improvements					\$0.00				
Subtact Capital Improvement Costs         \$1,975,000.00           Additional Capital Improvement Costs         \$1,975,000.00           Deviational Capital Improvement Costs         \$15,750.00           Deviational Capital Improvement Costs         \$15,750.00           Lisk         \$15,750.00           Traffic Coxtrid         \$39,375.00         L.S.           Subtoat On Provement Costs         \$39,375.00         L.S.           Subtoat Additional Capital Improvement Costs         \$37,750.00           Subtoat Index Costs         \$39,375.00           Subtoat Index Costs         \$37,750.00           Subtoat Index Costs         \$39,375.00           Subtoat Index Costs         \$37,750.00           Subtoat Index Costs         \$39,375.00           Costs         \$39,375.00           Subtoat Index Costs         \$37,750.00           Costs         \$39,375.00           Costs         \$30,00           Other Costs (Provement Costs)         \$31,375.00           Englineering         \$5%         \$91,300.00           Costrand Adminiconstructor Management         \$5%         \$91,300.00           Costrand Adminiconstructor Management         \$5%         \$91,300.00           Costrand Adminiconstructor Management Costs         \$10,404,800.	Special Items (User Defined)					\$1,575,000.00				
Additional Capital Improvement Costs         S15,750.00         L.S.         \$15,750.00           Mobilization         5%         -         \$78,750.00           Mobilization         \$39,375.00         L.S.         \$39,375.00           Utily Coordination/Relocation         \$39,375.00         L.S.         \$39,375.00           Subtract Additional Capital Improvement Costs         -         \$378,750.00           Subtract Additional Capital Improvement Costs         -         \$39,375.00           Subtract Additional Capital Improvement Costs         -         \$378,750.00           Les Advisition Costs         -         \$39,375.00           Subtract Additional Capital Improvement Costs         -         \$39,375.00           Les Advisition Costs         -         \$30,00           Contract Advision Costs         -         \$39,375.00           Subtract Land Acquisition Costs         -         \$39,375.00           Contract Advision Costs         -         \$30,00           Contract Advision Control         0%         -         \$39,375.00           Subtract I and Acquisition Costs         -         \$30,750.00         -           Contract Advision Control         0%         -         \$39,750.00         -           Contract Advision Control	Subtotal Capital Improvement Costs					\$1,575,000.00				
Dewatering         \$15,750.00         L.S.         \$15,750.00           Mobilization         5%         \$78,750.00         \$39,375.00           Traffic Cortrol         \$39,375.00         L.S.         \$39,375.00           Stormater Management/Torsion Control         \$39,375.00         L.S.         \$39,375.00           Stormater Management/Torsion Control         5%         \$39,375.00         LS.           Stormater Management/Torsion Control         5%         \$39,375.00         LS.           Stormater Management/Torsion Control         5%         \$39,375.00         LS.           Subtrait Additional Capital Improvement Costs         \$252,000.00         LS.         \$30,00           Subtrait Land Acquisition Costs         \$0.00         \$0.00         Stormateria           Other Costs (procentage of Capital Improvement Costs)         \$0.00         Stormateria         Stormateria           Contract Adminicrative         5%         \$90,00         Control         Stormateria           Contract Adminicrative         5%         \$90,00         Control         Stormateria           Contract Adminicrative         5%         \$91,300,00         Control         Control         Stormateria         Stormateria         Stormateria         Stormateria         Stormateria <td< td=""><td>Additional Capital Improvement Co</td><td>sts</td><td></td><td></td><td></td><td></td><td></td></td<>	Additional Capital Improvement Co	sts								
Mobilization         5%         ≤ \$78,750.0           Tafle Cartol         \$39,375.00         L.S.         \$39,375.00           Utily Coordination/Relocation         5%         L.S.         \$39,375.00           Subtract Additional Capital Improvement Costs         5%         S78,750.00           Subtract Additional Capital Improvement Costs         \$39,375.00         L.S.         \$39,375.00           Subtract Additional Capital Improvement Costs         \$30,375.00         State Capital Improvement Costs         \$30,00           Subtract Additional Capital Improvement Costs         \$30,00         State Capital Improvement Costs         \$30,00           Subtract Addition Construction Management Costs         \$30,00         State Capital Improvement Costs         \$30,00           Contract AdditionConstruction Management Costs         \$5%         \$31,850.00         \$31,850.00           Contract AdditionConstruction Management Costs         \$39,876.00         \$31,850.00         \$31,850.00           Contract AdditionConstruction Management Costs         \$39,876.00         \$31,850.00         \$31,850.00           Contract Addition Const Costs         \$31,850.00         \$31,850.00         \$31,850.00         \$31,850.00           Contract Addition Const Costs         \$31,850.00         \$31,850.00         \$31,850.00         \$31,850.00         <	Dewatering		\$15,750.00	L.S.		\$15,750.00				
Tarlie Correi         \$39,375.00         L.S.         \$39,375.00           Uity Coordinaton/Relocation         \$39,375.00         L.S.         \$39,375.00           Stormwater Management/Frozion Control         \$39,375.00         L.S.         \$39,375.00           Stormwater Management/Frozion Control         \$5%         \$39,375.00         LS           Stormwater Management/Frozion Control         \$5%         \$39,375.00         LS           Stormwater Management/Frozion Control         \$5%         \$39,375.00         LS           Motional Capital improvement Costs         \$50.00         \$30,00         LS         \$30,00           Subtrati Addition Costs         \$0.00         \$0.00         \$0.00         Control         Stor, 700.00         Control         Control         Control         Stor, 700.00         Control         Control         Control         Control         Control         Control         Control         Stor, 700.00         Control         Control         Control         Stor, 700.00         Cont	Mobilization		5%			\$78,750.00				
Utily Cordination/Relocation         \$39,375,00         LS.         \$39,375,00           Subtal Additional Capital Improvement Costs         5%         \$37,800         \$37,800           Land Additional Capital Improvement Costs         \$32,375,00         \$37,800         \$37,800           Contract Management Errorison         \$30,375,00         \$37,800         \$37,800           Both Costs         \$32,375,00         \$37,800         \$37,800           Contract Management Errorison         \$30,375,00         \$37,800         \$37,800           Other Costs (procentage of Capital Improvement Costs)         \$30,300         \$37,800         \$37,800           Contract Admin Construction Nanagement         5%         \$37,400,00         \$37,800           Contract Admin Construction Nanagement         5%         \$31,350,00         \$38,000           Contract Admin Construction Nanagement         25%         \$31,000,00         \$30,001,000           Contract Admin Construction Nanagement         25%         \$31,000,00         \$30,001,000         \$30,001,000           Contract Admin Construction Nanagement         25%         \$31,000,00         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000         \$30,001,000 <td< td=""><td>Traffic Control</td><td></td><td>\$39,375.00</td><td>L.S.</td><td></td><td>\$39,375.00</td><td></td></td<>	Traffic Control		\$39,375.00	L.S.		\$39,375.00				
Stormash Management Froncin Control         5%         \$78,50.00           Land Acquisition Costs         \$252,000.00	Utility Coordination/Relocation		\$39,375.00	L.S.		\$39,375.00				
Subtack Additional Capital Improvement Costs         \$252,000.00           Land Adjuilation Costs         \$0.00           ROW/Essements         \$0.00           Other Costs (percentage of Capital Improvement Costs)         \$0.00           Other Costs (percentage of Capital Improvement Costs)         \$0.00           Contract Adminicrative         \$10.00           Contract Adminicrative         \$10.00           Contract Adminicrative         \$10.00           Subtact I adminicrative         \$10.00           Contract Adminicrative         \$10.00           Contract Adminicrative         \$10.00           Contract Adminicrative         \$10.00           Description         Quantity         Unit         Unit           Unit Cost </td <td>Stormwater Management/Erosion Control</td> <td></td> <td>5%</td> <td></td> <td></td> <td>\$78,750.00</td> <td></td>	Stormwater Management/Erosion Control		5%			\$78,750.00				
Land Acquisition Costs         So 00           Subtest Land Acquisition Costs         \$0.00           Other Costs (percentage of Capital Improvement Costs)         \$0.00           Displication Costs (percentage of Capital Improvement Costs)         \$0.00           Contract AdminiStrative         \$9%           Contract AdminiStrative         \$9%           Contract AdminiStrative         \$9%           Contract AdminiStrative         \$10%           Contract AdminiStrative         \$182,700.00           Contract AdminiStrative         \$10%           Contract AdminiStrative         \$182,700.00           Contract AdminiStrative         \$10%           Contract AdminiStrative         \$10%           Contract AdminiStrative         \$10%           Total Capital Improvement Costs         \$2,831,850.00           Statistic Administrative Adminite Administrat	Subtotal Additional Capital Improvement Co	sts				\$252,000.00				
Notification         \$30.00           Other Costs (percentage of Capital Ingerovement Costs)         \$0.00           Other Costs (percentage of Capital Ingerovement Costs)         \$274,050.00           Legal/Administrative         5%         \$91,350.00           Contract Admin(Costsuction Reagement)         5%         \$91,350.00           Contract Admin(Costsuction Reagement)         10%         \$182,700.00           Contract Admin(Sease)         \$10,408.80.00         \$1000           Total Capital Improvement Costs         \$10,408.80.00         \$2,831,850.00           Statistical Capital Improvement Costs         \$2,831,850.00         \$2,831,850.00           Contract Admin(Sease)         \$2,831,850.00         \$2,831,850.00           Contract Capital Improvement Costs         \$2,831,850.00         \$2,831,850.00           Contract Capital Improvement Reagement         0.00         \$2,851.00         \$2,851.00           Effective Interest Rate         1.50%         \$2,92,850.00         \$2,92,850.00         \$2,92,850.00         \$2,92,850.00	Land Acquisition Costs					fa oa				
Subcla Lan Acquisition Costs Other Costs (percentage of Capital Improvement Costs)  Engineering Enging Engineering Engineering Engineering Engineering Engineering	ROW/Easements					\$0.00				
Engineering         15%         \$274,050.00           Logal Administrative         5%         \$31,350.00           Logal Administrative         5%         \$31,350.00           Contract Admini Construction Management         10%         \$182,700.00           Contract Administrative         5%         \$10,404.850.00           Subtotal Other Costs         \$10,404.850.00         Steps           Total Capital Improvement Costs         \$2,831,850.00         Steps           Master Plan Operation and Maintenance Cost Summary         \$2,831,850.00         Steps           Pescription         Quantity         Unit         Unit Cost         Total Annual Cost           Total Annual Operation and Maintenance Cost         Y         EA         \$808.00         Steps           Total Annual Operation and Maintenance Cost         Y         EA         \$851.00         Steps           Effective Interest Rate         1,5%         \$2,32,850.00         Steps         Steps           Effective Interest Rate         1,5%         \$2,32,850.00         Steps         Steps	Subtotal Land Acquisition Costs	Limprovement Costs)				\$0.00				
Englishering     10%     201,00000       Contract Admin/Construction Management     0%     301,00000       Contract Admin/Construction Management     10%     3182,700,000       Contract Admin/Construction Management     10%     348,670,000       Statistical Other Cests     \$1,004,880,00       Statistical Other Cests       Statistical Other Cest       Statistical Other Cest       Statistical Other Cests       Statistical Other Cests Over Statistical Other Cest       Statistical Other Cests Over Stati	Other Costs (percentage of Capital	i improvement Costs)	150/			\$274.050.00				
Contract Admin         Str.	Logal/Administration		5%			\$214,000.00				
Master Plan Operation and Maintenance Cost Summary         Unit         Unit         Unit         Cost of the model           Bescription         Quantity         Unit         Unit         Unit         Cost of the model         Static of the	Contract Admin/Construction Management		10%			\$192 700 00				
Subtrait Other Costs         \$1,004,850.00           Total Capital Improvement Costs         \$2,831,850.00           Master Plan Operation and Maintenance Cost Summary         Description           Quantity         Unit         Unit Cost           Total Annual Operation and Maintenance Cost         7         EA           Stockurst Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         7         EA           Total Annual Operation and Maintenance Cost         \$851.00         S851.00           Effective Interest Rate         1.50%         1.50%	Contingency		25%			\$456,750,00				
Total Capital Improvement Costs     \$1,831,850.00       Master Plan Operation and Maintenance Cost Summary       Description     Quantity     Unit     Unit     Total Annual Cost       tydrawic (e.g. debris removal, arosion, structural repairs, etc.)     7     EA     \$608.00       Total Annual Operation and Maintenance Cost     7     EA     \$608.00       Total Annual Operation and Maintenance Cost     \$851.00     1.50%       Effective Interest Rate     1.50%     1.50%	Consignary 25% \$406,7000									
Master Plan Operation and Maintenance Cost Summary         Value Cost         Total Annual Cost           Description         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         7         EA         Structure Maintenance         Structure Maintenance           Total Annual Operation and Maintenance Cost         \$851.00         \$851.00           Effective Interest Rate         1.50%         \$23.255.00	Total Capital Improvement Cost	is.				\$2 831 850 00				
Master Plan Operation and Maintenance Cost Summary           Description         Quantity         Unit         Unit Cost         Total Annual Cost           Aydrauk: Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         7         EA         \$608.00         \$851.00           Total Annual Operation and Maintenance Cost         \$851.00         \$851.00         \$851.00           Effective Interest Rate         1.50%         1.50%         \$23.256.00	Total oupliar improvement oos		φ2,001,000.00							
Description         Unit Operation and Maintenance Cost         Quantity         Unit         Unit Cost         Total Annual Cost           Hydraulc Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.)         7         EA         \$608.00         \$851.00           Total Annual Operation and Maintenance Cost         5         \$\$51.00         \$\$51.00         \$\$50.00           Effective Interest Rate         1,50%         \$\$23.785.00         \$\$23.00         \$\$25.00	Maste	Plan Operation and Maintenance	e Cost Summar	v						
Verse generation and Maintenance (e.g. debris removal, erosion, structural repairs, etc.) 7 EA \$608.00 \$851.00 \$701 Minited Cost \$701 Minited	Description		Quantity	, Unit	Unit Cost	Total Annual Cost				
Total Annual Operation and Maintenance Cost         \$851.00           Effective Interest Rate         1.50%           Total Operation and Maintenance Costs Over 50 Years         \$23 285.00	Hydraulic Structure Maintenance (e.o. debris re	emoval, erosion, structural repairs, etc.)	7	EA	\$608.00	\$851.00				
Effective Interest Rate  Total Operation and Maintenance Costs Over 50 Years  \$20 April 1.50%  \$20 April 1.50%  \$20 April 1.50%  \$20 April 1.50%	Total Annual Operation and Ma	intenance Cost				\$851.00				
Total Operation and Maintenance Costs Over 50 Years \$29 785 00	Effective Interest Rate					1.50%				
	Total Operation and Maintenan	ce Costs Over 50 Years				\$29 785 00				

MAS						
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7C					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7C	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)	L	1				
Modify Ditch for Aquatic & Habitat Passage	<ul> <li>Iser Defined Items</li> </ul>	1	1.5	\$250,000,00	\$250,000,00	
moully Dicition Aquatic & Habitat Lassage	Constant Delined Relins	1	L.U.	\$230,000.00	\$230,000.00	
	Master Plan Capital Impro	vement Cost Su	nmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention Mictor Quality Englished					\$0.00	
Deternuori/Water Quality Facilities					\$0.00	
Londooping and Maintenance Improvements					\$0.00	
Canadad Items (Lear Defined)					\$0.00	
Special items (Oser Denned)					\$250,000.00	
Subtotal Capital Improvement Costs	ata				\$250,000.00	
Additional Capital Improvement Cos	515	£0.500.00	1.0		£0.500.00	
Dewatering		\$2,500.00	L.S.		\$2,500.00	
Traffic Control		5%	1.0		\$12,500.00	
Inamic Control		\$6,250.00	L.S.		\$6,250.00	
Stermuster Management/Esosian Central		30,230.00	L.O.		\$0,230.00	
Stornwater Management/Erosion Control		3%			\$12,500.00	
Subtotal Additional Capital Improvement Cos	its				\$40,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs			_		\$U.00	
Other Costs (percentage of Capital	Improvement Costs)	1001	1		A 10 900 00	
Engineering		15%			\$43,500.00	
Legal/Administrative		5%			\$14,500.00	
Contract Admin/Construction Management		10%			\$29,000.00	
Contingency 25%						
Subtotal Other Costs						
Total Capital Improvement Costs						
Maste	r Plan Operation and Maintenan					
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Maintenance Cost					\$122.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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MA						
						1
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7D					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7D	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)		QUILLIN		0		
Modify Ditch for Aquatic & Habitat Passage	<user defined="" items<="" td=""><td>1</td><td>LS</td><td>\$250,000,00</td><td>\$250,000,00</td><td></td></user>	1	LS	\$250,000,00	\$250,000,00	
,					+=======	
	Master Plan Capital Improv	vement Cost Sur	nmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$250.000.00	
Subtotal Capital Improvement Costs					\$250,000,00	
Additional Capital Improvement Co	sts					
Dewatering		\$2,500,00	LS		\$2,500,00	
Mobilization		5%	2.01		\$12,500,00	
Traffic Control		\$6,250,00	LS		\$6,250,00	
Utility Coordination/Relocation		\$6,250.00	L.S.		\$6,250.00	
Stormwater Management/Erosion Control		5%			\$12,500.00	
Subtotal Additional Capital Improvement Con	sts				\$40,000,00	
Land Acquisition Costs	•••				1.0,000	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$43,500,00	
Legal/Administrative		5%			\$14,500,00	
Contract Admin/Construction Management		10%			\$29,000,00	
Contingency		25%			\$72,500.00	
Subtrait Other Costs						
Total Capital Improvement Costs						
· · · · · · · · · · · · · · · · · · ·			•			
Maste	r Plan Operation and Maintenand					
Description		Total Annual Cost				
Hydraulic Structure Maintenance (e.g. debris removal, erosion, structural repairs, etc.) 1 EA \$608.00						
Total Annual Operation and Ma	intenance Cost				\$122.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$4,270.00				

MAS						
		-		-		1
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7E					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7E	Jeremy Deischer		DATE :	2015-04-22	
r	r	1	r		1	7
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
180 ft, span bridge at 61st St.	<user defined="" items<="" td=""><td>5400</td><td>S.F.</td><td>\$250.00</td><td>\$1,350,000.00</td><td>30 ft width bridge at 61st St.</td></user>	5400	S.F.	\$250.00	\$1,350,000.00	30 ft width bridge at 61st St.
Old bridge removal	<user defined="" items<="" td=""><td>2700</td><td>S.F.</td><td>\$50.00</td><td>\$135,000.00</td><td>90 ft x 30 ft</td></user>	2700	S.F.	\$50.00	\$135,000.00	90 ft x 30 ft
						Π. · · · · ·
	Master Plan Capital Impro	vement Cost Su	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,485,000.00	
Subtotal Capital Improvement Costs					\$1,485,000.00	
Additional Capital Improvement Co	sts				.,	
Dewatering		\$14,850.00	L.S.		\$14,850.00	
Mobilization		5%			\$74,250.00	
Traffic Control		\$37,125.00	L.S.		\$37,125.00	
Utility Coordination/Relocation		\$37,125.00	L.S.		\$37,125.00	
Stormwater Management/Erosion Control		5%			\$74,250.00	
Subtotal Additional Capital Improvement Cos	sts				\$237,600.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)					
Engineering		15%			\$258,390.00	
Legal/Administrative		5%			\$86,130.00	
Contract Admin/Construction Management		10%			\$172,260.00	
Contingency		25%			\$430,650.00	
Subtotal Other Costs						
Total Capital Improvement Costs						
Maste						
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	30	L.F.	\$2.00	\$12.00	
Total Annual Operation and Ma	intenance Cost				\$12.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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MAS	]					
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7E-100yr					
JURISDICTION :	Boulder County			1		
REACH ID:	BCM-Reach7E-100yr	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Excavation, Mid Range		9180	C.Y.	\$29.00	\$266,220.00	Fill required for roadway reconstruction
Special Items (User Defined)						
220 ft. span bridge	<user defined="" items<="" td=""><td>6600</td><td>S.F.</td><td>\$250.00</td><td>\$1,650,000.00</td><td>30 ft width bridge at 61st St.</td></user>	6600	S.F.	\$250.00	\$1,650,000.00	30 ft width bridge at 61st St.
Remove and replace asphalt	<user defined="" items<="" td=""><td>6667</td><td>S.Y.</td><td>\$60.00</td><td>\$400,000.00</td><td>2000 ft of roadway reconstruction (N and S Side)</td></user>	6667	S.Y.	\$60.00	\$400,000.00	2000 ft of roadway reconstruction (N and S Side)
Old bridge remvoal	<user defined="" items<="" td=""><td>2700</td><td>S.F.</td><td>\$50.00</td><td>\$135,000.00</td><td>90 ft x 30 ft</td></user>	2700	S.F.	\$50.00	\$135,000.00	90 ft x 30 ft
	Master Plan Capital Impro	vement Cost Sui	mmary			
Capital Improvement Costs					£0.00	
Pipe Cuiverts and Storm Drains					\$0.00	
Concrete Box Cuiverts					\$0.00	
Channel Impresemente					\$0.00	
Detection/Water Quality Eacilities					\$200,220.00	
Percention valor quality racines					\$0.00	
Landecaning and Maintenance Improvemente					\$0.00	
Special Items (I ker Defined)					\$2 185 000 00	
Subtotal Capital Improvement Costs					\$2,451,220,00	
Additional Canital Improvement Co	ete				*=,,===	
Dewatering		\$24,512,20	LS		\$24,512,00	
Mobilization		5%			\$122,561,00	
Traffic Control		\$61,280,50	L.S.		\$61,281,00	
Utility Coordination/Relocation		\$61,280,50	L.S.		\$61,281,00	
Stormwater Management/Erosion Control		5%			\$122,561.00	
Subtotal Additional Capital Improvement Cos	sts				\$392,196.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$426,512.00	
Legal/Administrative		5%			\$142,171.00	
Contract Admin/Construction Management		10%			\$284,342.00	
Contingency		25%			\$710,854.00	
Subtotal Other Costs						
Total Capital Improvement Costs \$4,407,25						
Maste	r Plan Operation and Maintenan	ce Cost Summar	у			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris re	emoval, erosion, tree & weed removal, etc.)	30	L.F.	\$2.00	\$12.00	
Total Annual Operation and Ma	intenance Cost				\$12.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

MAS						
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7F					
JURISDICTION :	Boulder County			1		
REACH ID:	BCM-Reach7F	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
Remove pedestrian bridge	<user defined="" items<="" td=""><td>2250</td><td>S.F.</td><td>\$50.00</td><td>\$112,500.00</td><td>Existing 75ft x 30 ft</td></user>	2250	S.F.	\$50.00	\$112,500.00	Existing 75ft x 30 ft
180 ft span pedestrain bridge	<user defined="" items<="" td=""><td>2700</td><td>S.F.</td><td>\$300.00</td><td>\$810,000.00</td><td>180 ft x 15 ft</td></user>	2700	S.F.	\$300.00	\$810,000.00	180 ft x 15 ft
	Master Plan Capital Improv	ement Cost Sur	nmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$922,500.00	
Subtotal Capital Improvement Costs					\$922,500.00	
Additional Capital Improvement Co	sts					
Dewatering		\$9,225.00	L.S.		\$9,225.00	
Mobilization		5%			\$46,125.00	
Iraffic Control		\$13,837.50	L.S.		\$13,838.00	Decreased from default to 1.5%
Utility Coordination/Relocation		\$80,000.00	L.S.		\$80,000.00	Increased from default
Stormwater Management/Erosion Control		5%			\$46,125.00	
Subtotal Additional Capital Improvement Cos	its				\$195,313.00	
Land Acquisition Costs					£0.00	
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs Other Costs (percentage of Capital	Improvement Costs)		_		\$0.00	
Engineering		15%			\$167.672.00	
Legal/Administrative		5%			\$55.891.00	
Contract Admin/Construction Management		10%			\$111.781.00	
Contingency		25%			\$279,453.00	
Subtotal Other Costs						
Total Capital Improvement Costs \$1,73						
Master Plan Operation and Maintenance Cost Summary						
Description Quantity Unit Unit Cost To						
Channel Maintenance (e.g. sediment & debris re	emoval, erosion, tree & weed removal, etc.)	15	L.F.	\$2.00	\$6.00	
Total Annual Operation and Ma	intenance Cost				\$6.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Costs Over 50 Years						

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UD-MPCostv2.2\_Reach7.xlsm, BCM-Reach7F

PROJECT : Boulder Creek MDP - Keach 7  PR DNAGE WAY - Boulder Creek MDP - Keach 7	
REACH 7G	
JURISDICTION : Boulder County	
REACH ID: BCM-Reach7G Jeremy Deischer DATE : 2015-04-22	
DESCRIPTION QUANTITY UNIT UNIT COST COST USER CON	IMENTS
Pipe Culverts and Storm Drains	
Circular Pipes	
Diameter (in) Length (ft) No. of Barrels	
54-inch 600 1 600 LF. \$263.00 \$157,800.00	
Headwalls	
Diameter (in) Applicable No. or barrels 5.1.00 S3.512.00	
Winawalls (includes concrete arron)	
Diameter (in) No. of Barrels	
54-inch 1 2 EA \$10,706.24 \$21,412.00	
Special Items (User Defined)	
Remove existing diversion structure <user \$20,000.00="" \$20,000.00<="" 1="" defined="" items="" l.s.="" td=""><td></td></user>	
Master Plan Capital Improvement Cost Summary	
Capital Improvement Costs	
Pipe Culverts and Storm Drains \$182,725,00	
Concrete Box Culverts \$0.00	
Hydraulic Structures \$0.00	
Channel Improvements \$0.00	
Detention/Water Quality Facilities \$0.00	
Kemovais \$2,000	
Landscaping and waintenance improvements \$00.00	
Subtotal Canital Improvement Costs \$200.755.00	
Additional Capital Improvement Costs	
Dewatering \$2,027.25 L.S. \$2,027.00	
Mobilization 5% \$10,136.00	
Traffic Control \$5,068.13 L.S. \$5,068.00	
Utility Coordination/Relocation \$5,068.13 L.S. \$5,068.00	
Stormwater Management Erosion Control 5% \$10,136.00	
Subtotal Additional Capital improvement Costs \$32,435.00	
Land Acquisition Losts Commentation Losts Commentat	
Norricasmenta autorition Costs S0.00	
Other Costs (percentage of Capital Improvement Costs)	
Engineering 15% \$35,274.00	
Legal/Administrative 5% \$11,758.00	
Contract Admin/Construction Management 10% \$23,516.00	
Contingency 25% \$58,790.00	
Subtotal Other Costs \$129,338.00	
Total Capital Improvement Costs \$364,498.00	
Master Plan Operation and Maintenance Cost Summary	
master run Operation and waintenance Cost Summary Unit Unit Cost Total Annual Cost	
Culvert Maintenance (e.g. sediment & debris removal, erosion at entrance/exit, structural repairs, e 600 L.F. \$1.00 \$120.00	
Total Annual Operation and Maintenance Cost \$120.00	
Effective Interest Rate 1.50%	
Total Operation and Maintenance Costs Over 50 Years \$4,200.00	

MAS	STER PLAN COST ESTIMAT	E FOR INDIV	IDUAL RE	ACH		1
						1
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	7H					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7H	Jeremy Deischer		DATE :	2015-04-22	
		1		1		ni -
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Soil Riprap, Type M		356	C.Y.	\$85.00	\$30,222.00	Protection for Sanitary near Boulder Creek (400 LF)
Landscaping and Maintenance	Improvements					
Reclamation & seeding (native grasses)		0	ACRE	\$1 217 00	\$304.00	
Special Home (Llear Defined)						
Grade Control Structure to Protect Sanitary	<	2	1.5	\$205,000,00	\$410,000,00	
Grade Control Structure to Frotect Sanitary	Constant Denned Renna	2	L.O.	\$200,000.00	\$410,000.00	
	Master Plan Capital Improv	ement Cost Su	mmary			
Capital Improvement Costs			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$30,222.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$304.00	
Special Items (User Defined)					\$410,000.00	
Subtotal Capital Improvement Costs					\$440,526.00	
Additional Capital Improvement Cos	sts					
Dewatering		\$4,405.26	L.S.		\$4,405.00	
Mobilization		5%			\$22,026.00	
Traffic Control		\$11,013.15	L.S.		\$11,013.00	
Utility Coordination/Relocation		\$11,013.15	L.S.		\$11,013.00	
Stormwater Management/Erosion Control		5%			\$22,026.00	
Subtotal Additional Capital Improvement Cos	ts				\$70,483.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)	450/	1		670.054.00	
Engineering		15%			\$75,651.00	
Legal/Administrative		5%			\$25,550.00	
Contract Admin/Construction Management		\$127 752 00				
Subtotal Other Costs		\$281.054.00				
Subtail Uther Costs						
Maste	r Plan Operation and Maintenand	ce Cost Summar	'V			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	2	EA	\$608.00	\$243.00	
Total Annual Operation and Ma	intenance Cost				\$243.00	
Effective Interest Rate					1.50%	
Enclude Interest Rate						

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UD-MPCostv2.2\_Reach7.xlsm, BCM-Reach7H

MA						
PROJECT :	Boulder Creek MDP - Reach 7					
DRAINAGEWAY :	Boulder Creek					
REACH :	71					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach7I	Jeremy Deischer		DATE :	2015-04-22	
	1					
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Stream Restoration	<user defined="" items<="" td=""><td>6250</td><td>L.F.</td><td>\$133.00</td><td>\$831,250.00</td><td></td></user>	6250	L.F.	\$133.00	\$831,250.00	
ERC Riparian Restoration	<user defined="" items<="" td=""><td>14</td><td>AC</td><td>\$35,000.00</td><td>\$502,181.00</td><td>50 ft on each side of stream</td></user>	14	AC	\$35,000.00	\$502,181.00	50 ft on each side of stream
· · · ·						
	Master Plan Capital Improv	ement Cost Sur	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$1,333,431.00	
Subtotal Capital Improvement Costs					\$1,333,431.00	
Additional Capital Improvement Co	sts					
Dewatering		\$13,334.31	L.S.		\$13,334.00	
Mobilization		5%			\$66,672.00	
Traffic Control		\$33,335.78	L.S.		\$33,336.00	
Utility Coordination/Relocation		\$33,335.78	L.S.		\$33,336.00	
Stormwater Management/Erosion Control		5%			\$66,672.00	
Subtotal Additional Capital Improvement Co	sts				\$213,350.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs	Limprovement Costo)				\$0.00	
Other Costs (percentage of Capita	i iniprovement Costs)	4.59/	[		\$222.017.00	
Engineering Legal/Administration		F0/			\$232,017.00	
Contract Admin/Construction Management		3%			\$11,339.00	
Contract Aurinit/Construction Management		25%			\$134,676.00	
Company 20% \$388,69						
Total Capital Improvement Costs \$300						
Total Capital improvement Cost	13	φ2,337,310.00				
Macto	Plan Operation and Maintenance	e Cost Summar	v			
Description	i i fan operation and maintenand	Quantity	Junit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval erosion tree & weed removal etc.)	6250	LE	\$2.00	\$2,500,00	
Total Annual Operation and Ma	intenance Cost	2200		02.00	\$2,500,00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years				\$87 499 00	
. eta. operation and maintenan		wor,400.00				

MAS								
PROJECT :	Boulder Creek MDP - Reach 8		-					
DRAINAGEWAY :	Boulder Creek							
REACH :	8A							
JURISDICTION :	Boulder County							
REACH ID:	BCM-Reach8A	Jeremy Deischer		DATE :	2015-04-22			
		1	r					
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS		
Special Items (User Defined)								
ERC Estimate New Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$230,000.00</td><td>\$230,000.00</td><td></td></user>	1	L.S.	\$230,000.00	\$230,000.00			
ERC Estimate Riparian Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$140,000.00</td><td>\$140,000.00</td><td></td></user>	1	L.S.	\$140,000.00	\$140,000.00			
	Master Plan Capital Improv	vement Cost Sur	mmarv					
Capital Improvement Costs								
Pipe Culverts and Storm Drains					\$0.00			
Concrete Box Culverts					\$0.00			
Hydraulic Structures					\$0.00			
Channel Improvements					\$0.00			
Detention/Water Quality Facilities					\$0.00			
Removals					\$0.00			
Landscaping and Maintenance Improvements					\$0.00			
Special Items (User Defined)					\$370,000.00			
Subtotal Capital Improvement Costs					\$370,000.00			
Additional Capital Improvement Co	sts							
Dewatering		\$3,700.00	L.S.		\$3,700.00			
Mobilization		5%			\$18,500.00			
Traffic Control		\$9,250.00	L.S.		\$9,250.00			
Utility Coordination/Relocation		\$9,250.00	L.S.		\$9,250.00			
Stormwater Management/Erosion Control		5%			\$18,500.00			
Subtotal Additional Capital Improvement Cos	sts				\$59,200.00			
Land Acquisition Costs								
ROW/Easements					\$0.00			
Subtotal Land Acquisition Costs					\$0.00			
Other Costs (percentage of Capita	I Improvement Costs)	-	1		1			
Engineering		15%			\$64,380.00			
Legal/Administrative		5%			\$21,460.00			
Contract Admin/Construction Management		10%			\$42,920.00			
Contingency 25% \$107,300.0								
Subtotal Other Costs								
Total Capital Improvement Cost	ts							
Maste								
Description		Quantity	Unit	Unit Cost	Total Annual Cost			
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	1700	L.F.	\$2.00	\$680.00			
Total Annual Operation and Ma	intenance Cost	\$680.00						
Effective Interest Rate					1.50%			
Total Operation and Maintenance Costs Over 50 Years								

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UD-MPCostv2.2\_Reach8.xlsm, BCM-Reach8A

MAS	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH									
PROJECT :	Boulder Creek MDP - Reach 8									
DRAINAGEWAY :	Boulder Creek									
REACH :	8B									
JURISDICTION :	Boulder County					i i				
REACH ID:	BCM-Reach8B	Jeremy Deischer		DATE :	2015-04-22					
					ΤΟΤΑΙ					
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS				
Special Items (User Defined)	·									
ERC Estimate New Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$640,000.00</td><td>\$640,000.00</td><td></td></user>	1	L.S.	\$640,000.00	\$640,000.00					
ERC Estimate Riparian Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$390,000.00</td><td>\$390,000.00</td><td></td></user>	1	L.S.	\$390,000.00	\$390,000.00					
	Master Plan Capital Improv	ement Cost Su	mmary							
Capital Improvement Costs										
Pipe Culverts and Storm Drains					\$0.00					
Concrete Box Culverts					\$0.00					
Hydraulic Structures					\$0.00					
Channel Improvements					\$0.00					
Detention/Water Quality Facilities					\$0.00					
Removals					\$0.00					
Landscaping and Maintenance Improvements					\$0.00					
Special Items (User Defined)					\$1,030,000.00					
Subtotal Capital Improvement Costs					\$1,030,000.00					
Additional Capital Improvement Co	sts									
Dewatering		\$10,300.00	L.S.		\$10,300.00					
Mobilization		5%			\$51,500.00					
Traffic Control		\$25,750.00	L.S.		\$25,750.00					
Utility Coordination/Relocation		\$25,750.00	L.S.		\$25,750.00					
Stormwater Management/Erosion Control		5%	I		\$51,500.00					
Land Acquisition Costs	515				\$164,800.00					
ROW/Easements					\$0.00					
Subtotal Land Acquisition Costs					\$0.00					
Other Costs (percentage of Capita	I Improvement Costs)									
Engineering		15%			\$179,220.00					
Legal/Administrative		5%			\$59,740.00					
Contract Admin/Construction Management		10%			\$119,480.00					
Contingency		25%			\$298,700.00					
Subtotal Other Costs					\$657,140.00					
Total Capital Improvement Cost	S	\$1,851,940.00								
Maste	r Plan Operation and Maintenanc	e Cost Summar	.y	1						
Description		Quantity	Unit	Unit Cost	Total Annual Cost					
Channel Maintenance (e.g. sediment & debris n	emoval, erosion, tree & weed removal, etc.)	4800	L.F.	\$2.00	\$1,920.00					
Total Annual Operation and Ma	intenance Cost				\$1,920.00					
Effective Interest Rate					1.50%					
Total Operation and Maintenan	ce Costs Over 50 Years	Total Operation and Maintenance Costs Over 50 Years								

MA	1					
PROJECT :	Boulder Creek MDP - Reach 8					
DRAINAGEWAY :	Boulder Creek					
REACH :	8C					
JURISDICTION :	City of Boulder			1		
REACH ID:	BCM-Reach8C	Jeremy Deischer		DATE :	2015-04-22	1
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
220 ft railroad replacement	<user defined="" items<="" td=""><td>4000</td><td>S.F.</td><td>\$450.00</td><td>\$1,800,000.00</td><td>20 ft width</td></user>	4000	S.F.	\$450.00	\$1,800,000.00	20 ft width
Temp Bridge	<user defined="" items<="" td=""><td>1500</td><td>S.F.</td><td>\$350.00</td><td>\$525,000.00</td><td>75 ft x 50 ft</td></user>	1500	S.F.	\$350.00	\$525,000.00	75 ft x 50 ft
<u></u>						
	Master Plan Capital Impre	ovement Cost Su	mmary			
Capital Improvement Costs		of the sect out				
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$2,325,000.00	
Subtotal Capital Improvement Costs					\$2,325,000.00	
Additional Capital Improvement Co	osts					
Dewatering		\$23,250.00	L.S.		\$23,250.00	
Mobilization		5%			\$116,250.00	
Traffic Control		\$58,125.00	L.S.		\$58,125.00	
Utility Coordination/Relocation		\$58,125.00	L.S.		\$58,125.00	
Stormwater Management/Erosion Control		5%			\$116,250.00	
Subtotal Additional Capital Improvement Co	sts				\$372,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	il Improvement Costs)		r			
Engineering		15%			\$404,550.00	
Legal/Administrative		5%			\$134,850.00	
Contract Admin/Construction Management		10%			\$269,700.00	
Contingency		25%			\$674,250.00	
Subtotal Other Costs					\$1,483,350.00	
Total Capital Improvement Costs						
Maste	er Plan Operation and Maintena	nce Cost Summar	ry		1	
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	20	L.F.	\$2.00	\$8.00	
Total Annual Operation and Ma	aintenance Cost				\$8.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$280.00				

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UD-MPCostv2.2\_Reach8.xlsm, BCM-Reach8C

MAS	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH									
PROJECT : DRAINAGEWAY :	Boulder Creek MDP - Reach 8 Boulder Creek									
REACH :	8D									
JURISDICTION :	City of Boulder					<b> </b>				
REACH ID:	BCM-Reach8D	Jeremy Deischer		DATE :	2015-04-22					
[		1		r						
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS				
Special Items (User Defined)										
ERC Estimate New Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$340,000.00</td><td>\$340,000.00</td><td></td></user>	1	L.S.	\$340,000.00	\$340,000.00					
ERC Estimate Stream Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$210,000.00</td><td>\$210,000.00</td><td></td></user>	1	L.S.	\$210,000.00	\$210,000.00					
	Master Plan Capital Improv	ement Cost Sur	mmary							
Capital Improvement Costs										
Pipe Culverts and Storm Drains					\$0.00					
Concrete Box Culverts					\$0.00					
Hydraulic Structures					\$0.00					
Channel Improvements					\$0.00					
Detention/Water Quality Facilities					\$0.00					
Removals					\$0.00					
Landscaping and Maintenance Improvements					\$0.00					
Special Items (User Defined)					\$550,000.00					
Subtotal Capital Improvement Costs					\$550,000.00					
Additional Capital Improvement Co	štš	£5,500,00	1.0		65 500 00					
Dewatering		\$5,500.00	L.S.		\$5,500.00					
Mobilization		5% \$12,750,00	1.5		\$27,500.00					
Litity Coordination/Pelocation		\$13,750.00	1.5.		\$13,750.00					
Stormwater Management/Erosion Control		5%	L.U.		\$27,500.00					
Subtotal Additional Capital Improvement Cos	sts	070			\$88,000.00					
Land Acquisition Costs										
ROW/Easements					\$0.00					
Subtotal Land Acquisition Costs					\$0.00					
Other Costs (percentage of Capita	I Improvement Costs)									
Engineering		15%			\$95,700.00					
Legal/Administrative		5%			\$31,900.00					
Contract Admin/Construction Management		10%			\$63,800.00					
Contingency		25%			\$159,500.00					
Subtotal Other Costs					\$350,900.00					
Total Capital Improvement Cost	s				\$988,900.00					
Maste	r Plan Operation and Maintenand	e Cost Summar	v							
Description		Quantity	Unit	Unit Cost	Total Annual Cost					
Channel Maintenance (e.g. sediment & debris r	emoval, erosion, tree & weed removal, etc.)	2600	L.F.	\$2.00	\$1,040.00					
Total Annual Operation and Ma	intenance Cost				\$1,040.00					
Effective Interest Rate					1.50%					
Total Operation and Maintenan	ce Costs Over 50 Years	\$36,400.00								

MA						
						-
PROJECT :	Boulder Creek MDP - Reach 8					
DRAINAGEWAY :	Boulder Creek					
REACH :	8E					
JURISDICTION :	City of Boulder					
REACH ID:	BCM-Reach8E	Jeremy Deischer		DATE :	2015-04-22	
					τοται	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements	I.					
xcavation. Mid Range		133	C.Y.	\$29.00	\$3,867,00	30 ft x 40 ft x 3 ft
Special Home (User Defined)	-	100	0.11	Q20.00	\$5,557.55	bo RANOR KON
Postway Surface (Concrete)	lieor Dofined Home	42	CY	\$720.00	\$21.542.00	25. ft x 70. ft x 8 in
andecaning	coullear Defined tome	43	0.1. S E	\$2.00	\$1,045.00	2 of 70 ft v 5 ft
frage	sliear Dafined Kome	2	5.F.	\$500.00	\$1,400.00	2017011431
Signage / Barriers	careliser Defined items	2	FA	\$1.500.00	\$3,000,00	
Signage / Damers	Constant Delined Relins	2	LA	\$1,500.00	\$5,000.00	
	Master Plan Capital Impre	womant Cast Sur	many			
Capital Improvement Costs	Master Flan Capital Inpro	overnenit Cost Sui	ninary			
Capital Improvement Costs					\$0.00	
Concrete Box Culterte					\$0.00	
Autoulio Structuree					\$0.00	
hannel Improvements					\$3,967,00	
Detention/Water Quality Excilition					\$0,007.00	
Removals					\$0.00	
andecaping and Maintenance Improvements					\$0.00	
Special Items (Lear Defined)					\$26,042,00	
Subtotal Capital Improvement Costs					\$40,940,00	
Additional Capital Improvement Co	hete				\$40,010.00	
Additional Capital Improvement of	5313		1.5		\$0.00	
Aphilization		5%	L.U.		\$2,041,00	
Fraffic Control		\$1.020.25	1.5		\$1,020,00	
Hity Coordination/Pelocation		\$1,020.25	1.0.		\$1,020.00	
Stormwater Management/Erosion Control		5%	L.O.		\$2,041,00	
Subtotal Additional Canital Improvement Co	ete	070			\$6 122 00	
Land Acquisition Costs					\$0,122.00	
ROW/Fasements					\$0.00	
ubtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	al Improvement Costs)				- 3.00	
naineerina		15%			\$7.040.00	
egal/Administrative		5%			\$2,347,00	
Contract Admin/Construction Management		10%			\$4,693.00	
Contingency		25%			\$11,733.00	
Subtotal Other Costs					\$25,813,00	
Lotal Capital Improvement Cos	te				\$72 745 00	i de la companya de l
otal Capital improvement Cos	15				φ12,145.00	

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MAS	STER PLAN COST ESTIMAT					
PROJECT :	Boulder Creek MDP - Reach 8					
DRAINAGEWAY :	Boulder Creek					
REACH :	8F					
JURISDICTION :	Boulder County					. 1
REACH ID:	BCM-Reach8F	Jeremy Deischer		DATE :	2015-04-22	
r	π	,	r	1	TOTAL	
	1				TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
	Master Dian Canital Improv	amont Coat Su				
Conitel Improvement Costs	Master Plan Capital Improv	ement Cost Sur	nmary	_		
Capital Improvement Costs					£0.00	
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Cuiverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Candscapility and wanterlance improvements Special terms (Liker Defined)					\$0.00	
Subtotal Canital Improvement Costs					\$0.00	
Additional Capital Improvement Cost	sts				40.00	
Dewatering		\$0.00	LS		\$0.00	
Mobilization		5%			\$0.00	
Traffic Control		\$0.00	L.S.		\$0.00	
Utility Coordination/Relocation		\$0.00	L.S.		\$0.00	
Stormwater Management/Erosion Control		5%			\$0.00	
Subtotal Additional Capital Improvement Cos	its				\$0.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$0.00	
Legal/Administrative		5%			\$0.00	
Contract Admin/Construction Management		10%			\$0.00	
Contingency		25%	L		\$0.00	
Subtotal Other Costs			· · · · · · · · · · · · · · · · · · ·		\$0.00	
Total Capital Improvement Cost	S	<u> </u>			\$0.00	
Maste	r Plan Operation and Maintenanc					
Description	Than operation and maintenance	Total Annual Cost				
Sediment Removal (4 locations 1x annually)	<user defined="" items<="" td=""><td>800</td><td>C.Y.</td><td>\$30.00</td><td>\$24,000,00</td><td></td></user>	800	C.Y.	\$30.00	\$24,000,00	
Total Annual Operation and Ma	intenance Cost				\$24,000.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years				\$839.993.00	

MAS						
PROJECT :	Boulder Creek MDP - Reach 9					
DRAINAGEWAY :	Boulder Creek					
REACH :	9A					
JURISDICTION :	City of Boulder	In the second second	0045 04 00			
REACH ID:	BCM-Reach9A	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements				·		
Excavation, Mid Range		1303	C.Y.	\$29.00	\$37,773.00	Estimated cut
Landscaping and Maintenance	mprovements					
Reclamation & seeding (native grasses)		1	ACRE	\$1,219.00	\$1,219.00	
Trail/Path. Concrete (10' Width)		325	L.F.	\$54.00	\$17,550.00	
I and Acquisition						
Easement/ROW Acquisition		0.30	ACRE	\$550,000.00	\$165,000.00	
	Master Plan Capital Improv	ement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$37,773.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$18,769.00	
Special Items (User Defined)					\$0.00	
Subtotal Capital Improvement Costs					\$56,542.00	
Additional Capital Improvement Cos	ts	1	1			
Dewatering		\$565.42	L.S.		\$565.00	
Mobilization		5%			\$2,827.00	
Traffic Control		\$1,413.55	L.S.		\$1,414.00	
Utility Coordination/Relocation		\$1,413.55	L.S.		\$1,414.00	
Stormwater Management/Erosion Control		5%			\$2,827.00	1
Subtotal Additional Capital Improvement Cost	S				\$9,047.00	
Land Acquisition Costs						
ROW/Easements					\$165,000.00	
Subtotal Land Acquisition Costs Other Costs (percentage of Capital	Improvement Costs)				\$165,000.00	
Engineering		15%			\$9,838.00	
Legal/Administrative		5%			\$3,279.00	
Contract Admin/Construction Management		10%			\$6,559.00	
Contingency		25%			\$16,397.00	
Subtotal Other Costs					\$36,073.00	
Total Capital Improvement Costs						
				-		H
Master	Plan Operation and Maintenand	ce Cost Summar	у			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Trail Maintenance (e.g. structural repairs, crushe	r fines, etc.)	325	L.F.	\$6.00	\$390.00	
Total Annual Operation and Mai	ntenance Cost				\$390.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenand	e Costs Over 50 Years				\$13,650,00	

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PROJECT: Badder Creek MDP - Reach 9 DRANDEWAY: DRANDEWAY: DATE: 2015-04-22            DESCRPTION         QUANTITY         UNIT         UNIT COST         TOTAL COST           Landscaping and Maintenance Improvements         21001         C.V.         \$200         504.4500.00         Curregated           Special Rems (User Defined)         7         ACRE         \$1277.00         \$15.190.0         Target Common Cost           Special Rems (User Defined)	MAS	STER PLAN COST ESTIMAT	E FOR INDIV	DUAL RE	ACH		1
PROJECT:         Boulder Greek MDP - Rach B           BRANLGEWIN         Boulder Greek MDP - Rach B           READ:         Boulder Greek MDP - Rach B           UNISIGECTION         City of Boulder           DESCRIPTION         City of Boulder           DESCRIPTION         CUUANTITY         UNIT         UNIT         COST         USER COMMENTS           Channel Improvements         21201         C.V.         S20 00         S644.800.00         Out regared           Cancer Rooranguicon         7         ALAF         S1207.00         S044.800.00         Out regared           Cancer Rooranguicon			-		-		-
DRAMACEWAY:         Bodder Creek           RECHT         96           JHRSOCTON:         City of Bodder           BOK Rackelle         Jurner Construction           BOK Rackelle         Jurner Construction           DESCRIPTION         QUANTITY         UNIT         UNIT COST         TOTAL           DESCRIPTION         QUANTITY         UNIT         UNIT COST         COST         USER COMMENTS           Channel Inprovements         20201         C.Y.         520.0         561.4250.0         Jurner Cost           Carlanda Audoli (rule granes)         7         ACRE         51.277.00         56.518.00         Interview           Special Items (User Defined)         7         ACRE         51.270.00         56.518.00         Interview           Special Items (User Defined Items         7         ACRE         51.270.00         56.500.00         Interview           Remotel (A Rever Channel Items         556.0         1.57.5         5100.00         569.00.00         Interview           Special Items (User Defined Items         7         ACRE         51.270.00         5120.00.00         Interview           Remotel (B Rever Channel Items         556.00         S.Y.         \$50.00         5120.00.00         Interview         In	PROJECT :	Boulder Creek MDP - Reach 9					
BLACH :         99           DBSDCRIP :         DBARBaciditis         Jante :         10150:100           DESCRIPTION         QUANTITY         UNIT         UNIT COST         TOTAL         USER COMMENTS           Channel Improvements	DRAINAGEWAY :	Boulder Creek					
Bit Statistic Tribing         Bit year Boulder         Date :         Difference           BESCRPTION         QUANTITY         UNIT         UNIT         Cost         USER COMMENTS           Channel Improvements         2101         C.Y.         520.00         State Cost         Garagement           Channel Improvements         2101         C.Y.         520.00         State Cost         Garagement           Readmand Maintenance Improvements         7         ACRE         514.02.00         State Cost         State Cost           Tarbaha, Concreto (19 Wah)         7         ACRE         540.00         State Cost         State Co	REACH :	9B					
REACH IC         DURRescheid         Jurrery Descher         Datt:         Winder           DESCRIPTION         QUANTITY         UNIT         UNIT         Cost         USER COMMENTS           Channel Improvements         21201         X         5200         Original           Exeration. MR Mange         21201         X         5200         Original           Exeration. MR Mange         2200         LF.         541.00         581.50.00         Original           Tend Cost Reconstruction	JURISDICTION :	City of Boulder			1		
DESCRIPTION         QUANTITY         UNIT         UNIT         UNIT         COST         USER COMMENTS           Channel Improvements         21201         C.Y.         \$20.00         \$914.492.00         Outrepared           Bedration & Reading (rathe grande)         7         ACRE         \$12.27.00         \$8.55.90.0         Sec.90.00         Sec.90.00 <td>REACH ID:</td> <td>BCM-Reach9B</td> <td>Jeremy Deischer</td> <td></td> <td>DATE :</td> <td>2015-04-22</td> <td></td>	REACH ID:	BCM-Reach9B	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION         QUANTITY         UNIT         UNIT COST         COST         USER COMMENTS           Channel Improvements         21201         C.Y.         520.00         \$614.820.00         Currepuired           Exeration, MR Mange         21201         C.Y.         520.00         \$614.820.00         Currepuired           Exeration State Mange (rative grasse)         7         ACRE         \$1,277.00         \$81,500.00         Tell Provide           Tail Part, Concrite (10 Web)         250         L.F.         \$84.00.00         \$85.00.00         Tell Part, Concrite (10 Web)           Special Items (User Defined         520.00         L.F.         \$85.00.00         \$85.00.00         Tell Part, Concrite (10 Web)           Special Items (User Defined Items         7         EA         \$80.00.00         \$85.00.00         Tell Part, Concrite (10 Web)         Tell Part, Concrite (10 Web						τοται	
Desk KP FLAM         OWD AVELOST         COST         OSER COWMENTS           Channel ImprovementS         2100         C.Y.         \$20.00         \$6014.80.00         Carreguined           Exaterior, Mid Range         200         C.Y.         \$20.00         \$614.80.00         Carreguined           Tarleyah, Concrete (VW ubit)         200         L.F.         \$8600         \$15300.00         Enventor           Special Items (User Defined Items         7         C.R.         \$8000         \$455.000.00         Enventor           Special Items (User Defined Items         7         EA         \$80000.00         \$455.000.00         Enventor	DESCRIPTION		OUANTITY	LINUT	UNIT COST	COST	LICED COMMENTS
Channel improvements         C.Y.         \$29.00         \$614.820.00         Currequired           Exeration, M4 Range         7         24201         C.Y.         \$29.00         \$614.820.00         Currequired           Exclands.com/dation (ration gasse)         250         L.F.         \$84.00         \$13.800.00            Special letters (User Defined terms         7         E.A.         \$86.500.00         \$8.5500.00            Special Court Netconton <user defined="" td="" terms<="">         6.04         \$F.         \$10.000         \$\$65.600.00            Special Herms (User Defined terms         6.04         \$F.         \$10.000         \$\$65.600.00            Special Herms (Base defined terms         6.040         \$F.         \$10.000         \$\$65.600.00            Removed Horms (B         <user defined="" td="" terms<="">         6.040         \$Y.         \$60.00         \$12.000.000            Removed Horms (B         <user defined="" td="" terms<="">         6.040         \$Y.         \$60.00         \$7.97.920.000         \$26 per S.F           Easternert KOW Acquision         T.00         ACRE         \$1.13.25.000.00         \$7.97.920.000         \$26 per S.F           Po Cahrist and Storn Dains         T.00         ACRE</user></user></user>	DESCRIPTION		QUANTIT	UNII	UNIT COST	COSI	USER COMMENTS
Distant Ange         2101         C.V.         S20.00         S614.89.00         Datagend distances           Audroscaping and Maintenance Improvements         7         ACRE         \$1,217.00         \$8,810.00         Imagend Maintenance           Secteration & sending (nake quases)         7         ACRE         \$1,217.00         \$8,810.00         Imagend Maintenance           Special terms (User Defined)	Innel Improvements					1	
Landscaping and Maintenance improvements         7         ACRE         \$1,171.00         \$3,6150.00           Tail-Park Concrete (10 With)         200         L.F.         \$5,000         \$1,000.00           Special terms (Loor Reconstruction        User Defined terms         7         EA         \$56,000.00         \$1,000.00	ation, Mid Range		21201	C.Y.	\$29.00	\$614,829.00	Cut required
Redurmation & seeding (rative grasses) Trainis Court Reconstruction         7         ACR         \$1,21,00         \$8,519,00           Special Rems (US with binance of US with	dscaping and Maintenance	Improvements					
Tan Parl         250         LF.         Statu         Statu           Special terms (User Defined)        User Defined terms         7         EA         \$86,000.00         \$466,000.00           Basketat Court Reconstruction        User Defined terms         1         EA         \$80,000.00         \$80,000.00           Basketat Court Reconstruction        User Defined terms         5594         S.F.         \$500.00         \$559,400.00           Removal of Homes (3)        User Defined terms         5640         S.Y.         \$500.00         \$528,400.00           Removal of Homes (3)        User Defined terms         5640         S.Y.         \$500.00         \$528,400.00           Land Acquisition        User Defined terms         5640         S.Y.         \$500.00         \$528,400.00           Land Acquisition         7.00         ACRE         \$1,132,560.00         \$528,400.00         \$528,400.00           Capital Improvement Costs	mation & seeding (native grasses)		7	ACRE	\$1,217.00	\$8,519.00	
Special terms (User Defined)	ath, Concrete (10' Width)		250	L.F.	\$54.00	\$13,500.00	
Ternis Court Reconstruction        User Defined Items         7         EA         \$865.000.00         \$465.000.00           Basketbal Court Reconstruction        User Defined Items         1         EA         \$50,000.00         \$50,000.00           Basketbal Court Reconstruction        User Defined Items         5094         S.F.         \$100.00         \$556,400.00           Removal of Homes (3)        User Defined Items         5094         S.F.         \$100.00         \$558,400.00           Removal of Homes (3)        User Defined Items         5694         S.F.         \$100.00         \$338,400.00           Land Acquisition        User Defined Items         5694         S.Y.         \$80.00         \$338,400.00           Land Acquisition        User Defined Items         5640         S.Y.         \$80.00         \$338,400.00           Land Acquisition        User Defined Items         5640         S.Y.         \$80.00         \$338,400.00           Land Acquisition        User Defined Items         5640         S.Y.         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00	cial Items (User Defined)						
Baskendal Court Relocation         eUser Defined Items         1         EA         \$30,000.00         \$30,000.00           Acquisition (Anomes (3)         eUser Defined Items         504         S.F.         \$100,000         \$\$120,000.00           Acquisition (Anomes (3)         eUser Defined Items         504         S.F.         \$100,000         \$\$120,000.00           Acquisition	s Court Reconstruction	<user defined="" items<="" td=""><td>7</td><td>EA</td><td>\$65.000.00</td><td>\$455.000.00</td><td></td></user>	7	EA	\$65.000.00	\$455.000.00	
Acquisition of Homes (3)         cUser Defined Items         5504         S.F.         \$100.00         \$559.400.00           Removal of Homes (3)         cUser Defined Items         3         EA         \$400.000.00         \$120.000.00           Removal of Homes (3)         cUser Defined Items         5640         S.Y.         \$500.00         \$120.000.00           Land Acquisition         cUser Defined Items         5640         S.Y.         \$500.00         \$338.400.00           Land Acquisition         cUser Defined Items         5640         S.Y.         \$500.00         \$338.400.00           Easement/ROW Acquisition         7.00         ACRE         \$1,132.560.00         \$7,927.920.00         \$28 per S.F.           Capital Improvement Costs         mark         \$0.00         \$50.00         \$50.00         \$50.00           Correte Box Clubris         \$0.00         \$50.00         \$50.00         \$50.00         \$50.00           Correte Box Clubris         \$0.00         \$50.00         \$50.00         \$50.00         \$50.00           Correte Box Clubris         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00           Correte Box Clubris         \$50.00         \$50.00         \$50.00         \$50.00         \$50.00	atball Court Relocation	<user defined="" items<="" td=""><td>1</td><td>EA</td><td>\$30,000.00</td><td>\$30,000.00</td><td></td></user>	1	EA	\$30,000.00	\$30,000.00	
Service of Homes (3)         eUser Defined Items         3         EA         \$40,000,00         \$120,000,00           Sephata Bernoxe and Replace         eUser Defined Items         5640         S.Y.         \$660,00         \$338,400,00           Sephata Bernoxe and Replace          7.00         ACRE         \$1,132,660,00         \$389,400,00           Easement/ROW Acquisition         7.00         ACRE         \$1,132,660,00         \$26 per S.F.           Master Plan Capital Improvement Cost Summary           Source Box Colverts           \$0,00           Source Box Colverts of Source Box Colverts           \$0,00           Source Box Colverts of Source Box Colverts           \$0,00           \$0,00           Source Box Colverts           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00           \$0,00 <td< td=""><td>sition of Homes (3)</td><td><user defined="" items<="" td=""><td>5594</td><td>S.F.</td><td>\$100.00</td><td>\$559,400.00</td><td></td></user></td></td<>	sition of Homes (3)	<user defined="" items<="" td=""><td>5594</td><td>S.F.</td><td>\$100.00</td><td>\$559,400.00</td><td></td></user>	5594	S.F.	\$100.00	\$559,400.00	
Spital Remove and Replace         own-User Defined Items         5640         S.Y.         \$80.00         \$338.400.00           Land Acquisition         7.00         ACRE         \$1,132.660.00         \$7.927,920.00         \$26 per S.F.           Control Intercent Costs           Master Plan Capital Improvement Cost Survey         \$26 per S.F.           Oper Control Intercent Cost Survey         \$26 per S.F.           Oper Control Intercent Cost Survey           Survey Control Intercent Cost Survey	val of Homes (3)	<user defined="" items<="" td=""><td>3</td><td>EA</td><td>\$40,000.00</td><td>\$120,000.00</td><td></td></user>	3	EA	\$40,000.00	\$120,000.00	
Land Acquisition         X.00         ACRE         \$1,132,600.00         \$26 per S.F.           Cabability of the colspan="2">Colspan="2"         \$20,00         S0.00         S0.00 <th< td=""><td>alt Remove and Replace</td><td><user defined="" items<="" td=""><td>5640</td><td>S.Y.</td><td>\$60.00</td><td>\$338,400.00</td><td></td></user></td></th<>	alt Remove and Replace	<user defined="" items<="" td=""><td>5640</td><td>S.Y.</td><td>\$60.00</td><td>\$338,400.00</td><td></td></user>	5640	S.Y.	\$60.00	\$338,400.00	
Easement ROW Acquisition         7.00         ACRE         \$1,132,560.00         \$28 per S.F.           Master Plan Capital Improvement Cost Summary Capital Improvement Costs         \$0.00         \$28 per S.F.           Point Capital Improvement Cost Summary Capital Improvement Costs         \$0.00         \$0.00           Status Capital Improvement Cost Summary Sectors Successing Capital Improvement Costs         \$0.00           Status Capital Improvement Cost Summary Sectors Successing Capital Improvement Costs         \$0.00           Status Capital Englisher Summary Sectors Successing Capital Improvement Successing Capital Improvement Successing Capital Improvement Costs         \$0.00           Status Capital Improvement Costs         \$1.00.00           Status Capital Improvement Costs         \$21,396.48         LS         \$21,396.00         \$21,396.00         \$21,396.00         \$21,396.00         \$21,396.00         \$21,396.01	d Acquisition				· · · · · · · · · · · · · · · · · · ·		
Master Plan Capital Improvement Costs       Spe Cuters and Storm Drains       Spe Cuters and Storm Drains and Storm Drains       Special Iters (User Defined)       Store and Storm Drains and Storm Drains       Special Iters (User Defined)       Store and Storm Drains and Storm Dra	nent/ROW Acauisition		7.00	ACRE	\$1,132,560,00	\$7.927.920.00	\$26 per S.F.
Master Plan Capital Improvement Costs Survey         Gold Improvement Costs         Specification Control         Specif		•					• •
Chick Ingrowment Costs         S0.00           Pipe Cuberts and Storm Drains         \$0.00           Operating Bior Cuberts         \$0.00           Approximation Structures         \$0.00           Operating Bior Cuberts         \$0.00           Approximation Structures         \$0.00           Determine Transmitter         \$0.00           Stores         \$0.00           Stores         \$0.00           Stores         \$0.00           Stores         \$0.00           Stores         \$1.00.2000           Stores         \$1.00.2000           Stores         \$2.139.64.80           Mobilization         \$51.92.800.00           Stores         \$21.396.48           LS.         \$21.396.49           LS.         \$21.396.49           LS.         \$21.396.49           Determine Transmitter <td< td=""><td></td><td>Master Plan Capital Improv</td><td>ement Cost Su</td><td>mmarv</td><td></td><td></td><td></td></td<>		Master Plan Capital Improv	ement Cost Su	mmarv			
Sign During         \$0.0           Sign During         \$0.0           Surnite Bic Sharb Trains         \$0.0           Surnite Bic Sharb Trains         \$0.0           During Improvements         \$0.0           Surnite Bic Sharb Trains         \$0.0           Surnite Bic Sharb Trains         \$0.0           Surnite Cally Facilities         \$0.0           Surnite Cally Facilities         \$0.0           Surnite Cally Facilities         \$0.0           Surnites (Dar During of Maintenance Improvements         \$0.0           Surdcall Gaptal Improvement Cests         \$1.50, 80.00           Surdcall Gaptal Improvement Cests         \$2.136, 84           Surdcall Captal Improvement Cests         \$2.136, 84           Methics Control         \$5.4.81, 96.00           Methics Control         \$5.4.81, 96.00           Additional Control         \$5.4.81, 20           Surnature Management/Ecosion Control         \$5.3.481, 20           Surnature Management/Ecosion Control         \$5.4.81, 20           Surnature Management/Ecosion Control         \$5.6           Surnature Management/Ecosion Control         \$5.6           Surnature Management/Ecosion Control         \$5.7, 927, 920.00           Surtotal Adgatistion Costs         \$7.87, 920.00	Capital Improvement Costs						
Source Box Calverts         \$0.00           Aydradic Structures         \$0.00           Aydradic Structures         \$0.00           Detension Margonants         \$0.00           Structures         \$0.00           Structures         \$0.00           Structures         \$0.00           Structures         \$0.00           Structures         \$0.00           androcaping and Mainterance Improvements         \$0.00           Structures         \$1.00.00           Structures         \$1.00.00           Structures         \$1.00.00.00           Structures         \$1.00.00.00           Structures         \$1.00.00.00           Structures         \$1.00.00           Structures         \$1.00.00.00           Structures         \$1.00.00           Structures         \$1.00.00           Structures         \$1.00.00           Structures         \$1.00.00           Structures	Culverts and Storm Drains					\$0.00	
htmls         \$0.0           andscaping and Mainsance Improvements         \$0.0           andscaping and Mainsance Improvements         \$0.0           andscaping and Mainsance Improvements         \$1.02.80.00           unctact         \$1.502.80.00           unctact         \$1.502.80.00           Additional Capital Improvement Costs         \$2.38,48.00           Mathematics         \$2.38,48.00           Additional Capital Improvement Costs         \$2.38,48.00           Additional Capital Improvement Costs         \$2.38,48.120           Additional Capital Improvement Costs         \$3.349.120           Inflic Control         \$5%           Untract Mathematics         \$3.349.120           Untract Mathematics         \$3.349.120           Untract Mathematics         \$3.349.120           Untract Mathematics         \$3.349.00           Untract Mathematics         \$3.349.120           Untract Mathematics         \$3.349.00           Untract Mathematimprovement Costs         \$3.369.20 </td <td>rete Box Culverts</td> <td></td> <td></td> <td></td> <td></td> <td>\$0.00</td> <td></td>	rete Box Culverts					\$0.00	
hannel Improvements         \$614.820.00           wenter/Ni Warr Quark Yacilities         \$0.00           annotacipity and Maintenance Improvements         \$0.00           annotacipity and Maintenance Improvements         \$0.00           decla thers (User Defined)         \$1.002.000.00           ubtotal Capital Improvement Costs         \$1.002.000.00           decla thers (User Defined)         \$1.002.000.00           ubtotal Capital Improvement Costs         \$1.002.000.00           decla thers (User Defined)         \$1.002.000.00           ubtotal Capital Improvement Costs         \$1.002.000.00           decla thers (User Defined)         \$1.002.000.00           ubtotal Capital Improvement Costs         \$1.002.000.00           rafile Cordin Chaptal Improvement Costs         \$1.002.000.00           tip (Cordination/Relocation Costno)         \$53.491.00           tip (Cordination/Relocation Control         \$53.491.20           tip (Cordination/Relocation Control         \$54.902.00           totat Additional Capital Improvement Costs         \$1.002.000.00           totat Mathematication Control         \$53.491.20           totat Mathematication Control         \$54.902.00           Ubtotal Load Logistation Costs         \$1.002.000.00           Ubtotal Load Logistation Costs         \$1.002.000.00	ulic Structures					\$0.00	
stands         \$0.0           andscalip facilities         \$0.0           andscalip and Maintenance Improvements         \$22.015.00           picalitiens (Lapital Improvements Costs         \$1.502.00.00           ubtotal Capital Improvement Costs         \$1.502.00.00           Additional Capital Improvement Costs         \$1.502.00.00           ubtotal Capital Improvement Costs         \$1.502.00.00           Additional Capital Improvement Costs         \$21.306.48         L.S.         \$21.306.00           bitizedon         6%         \$106.902.00         \$1000.000.000           thit Cortrol         \$33.491.20         L.S.         \$33.491.00           ubtotal Capital Improvement Costs         \$1000.000.000         \$1000.000.000           ubtotal Additional Capital Improvement Costs         \$33.491.20         L.S.         \$33.491.00           ubtotal Capital Improvement Costs         \$1000.000.000         \$1000.000.000         \$1000.000.000           ubtotal Additional Capital Improvement Costs         \$1000.000.000         \$1000.000.000         \$1000.000.000           ubtotal Additional Capital Improvement Costs         \$1000.000.000         \$1000.000.000         \$1000.000.000           Ubtotal Additional Capital Improvement Costs         \$1000.000.000.000.000         \$1000.000.000.000.000.000         \$1000.000.000.00	nel Improvements					\$614,829.00	
anovals anovals anovals anovals anovals bit	tion/Water Quality Facilities					\$0.00	
andscaping and Maintenance Improvements	vals					\$0.00	
Special Items (Lker Defined)         \$1,502,800.00           Additional Cepital Improvement Costs         \$2,1386,400           Additional Cepital Improvement Costs         \$2,1386,400           Devolutional Cepital Improvement Costs         \$2,1386,400           Oblication         \$1,002,800           Additional Cepital Improvement Costs         \$2,1386,400           Devolutional Cepital Improvement Costs         \$2,1386,400           Statistical Cost         \$50,491.20         L.S.           Statistical Cost         \$53,491.20         L.S.         \$53,491.00           Stormwater Management/Ecosian Control         \$5%         \$106,982.00         \$106,982.00           Stortal Additional Capital Improvement Costs         \$5%         \$106,982.00         \$20           Stortal Additional Capital Improvement Costs         \$5%         \$106,982.00         \$20           Stortal Addition Capital Improvement Costs         \$5%         \$342,342.00         \$20           Control         \$5%         \$7,927,920.00         \$5%         \$5%         \$5%           Other Costs (percentage of Capital Improvement Costs)         \$57,229.00         \$57,229.00         \$57,229.00	caping and Maintenance Improvements					\$22,019.00	
Subtoil Capital Improvement Costs         \$2,33,64.00           Additional Capital Improvement Costs         \$2,33,64.00           Develation Charling Control         \$21,386.48         L.S.         \$21,386.00           Develation Control         \$50,64.80         \$50,892.00         \$50,892.00           Infling Control         \$53,491.20         L.S.         \$53,491.00           Stormature Management/Erosion Control         \$50         \$50,892.00           Stormature Management/Erosion Control         \$50         \$50,892.00           Subtoil Additional Capital Improvement Costs         \$50,592.00         \$50,592.00           Subtoil Additional Capital Improvement Costs         \$50,592.00         \$50,592.00           Subtoil Additional Capital Improvement Costs         \$50,592.00         \$50,592.00           Subtoil Add_capitalition Costs         \$50,592.00         \$50,592.00           Other Costs (percentage of Capital Improvement Costs)         \$7,572.920.00         \$50,592.00           Other Costs (percentage of Capital Improvement Costs)         \$7,572.920.00         \$50,592.00	al Items (User Defined)					\$1,502,800.00	
Additional Capital Improvement Costs         \$21,386,48         L.S.         \$21,386,00           Additional Capital Improvement Costs         \$7%         \$106,982,00         \$106,982,00           Additional Capital Improvement Costs         \$30,401,20         L.S.         \$53,441,00           Isting Coordination/Relocation         \$53,401,20         L.S.         \$53,441,00           Isting Coordination/Relocation         \$53,401,20         L.S.         \$53,441,00           Isting Coordination/Relocation         \$5%         \$106,982,00         \$106,982,00           Isting Coordination Capital Improvement Costs         \$5%         \$106,982,00         \$106,982,00           Isting Coordination Capital Improvement Costs         \$5%         \$106,982,00         \$106,982,00           Isting Coordination Capital Improvement Costs         \$5%         \$50,982,00         \$106,982,00           Isting Coordination Capital Improvement Costs         \$7,927,920,00         \$106,982,00         \$106,982,00           Other Costs (percentage of Capital Improvement Costs         \$7,927,920,00         \$106,982,00         \$106,982,00           Other Costs (percentage of Capital Improvement Costs)         \$7,229,00,00         \$106,982,00         \$106,982,00	tal Capital Improvement Costs					\$2,139,648.00	
Jewatering         \$21,386,48         L.S.         \$21,396,00           Jewitzering         \$76,382,00         \$106,820.00           Taffic Control         \$53,491.00         LS.         \$53,491.00           Itily Condition/Relocation         \$53,491.20         LS.         \$53,491.00           Starmaterr Management/Erosion Control         \$53,491.20         LS.         \$53,491.00           Starmaterr Management/Erosion Control         \$5%         \$106,982.00            Starting Lander Management/Erosion Control         \$7,927,920.00             Other Costs (percentage of Capital Improvement Costs)         \$77,292.00 <td>Additional Capital Improvement Cos</td> <td>sts</td> <td>1</td> <td></td> <td></td> <td></td> <td></td>	Additional Capital Improvement Cos	sts	1				
Mobilization         5%         \$106,982,00           Mobilization         \$53,491,20         L.S.         \$53,491,00           Jilly Coordination/Relocation         \$53,491,20         L.S.         \$53,491,00           Strondard Relocation         \$53,491,20         L.S.         \$56,982,00           Strondard Relocation         5%         \$106,982,00         \$106,982,00           Strondard Relocation         5%         \$17,97,920,00         \$106,982,00           Other Costs (percentage of Capital Improvement Costs)         57,72,920,00         \$106,992,00         \$106,992,00           Other Costs (percentage of Capital Improvement Costs)         57,72,920,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$106,992,00         \$10	iering		\$21,396.48	L.S.		\$21,396.00	
Tartlic Cordroi         \$53,491.20         L.S.         \$53,491.00           Likly Coordination/Relocation         \$53,491.20         L.S.         \$53,491.00           Stormater Management/Exclor         \$53,491.20         L.S.         \$53,491.00           Stormater Management/Exclor         \$5%         \$106.982.00           Subtotal Additional Capital Improvement Costs         \$342,342.00           Land Aquisition Costs         \$7,927,920.00           Other Costs (percentage of Capital Improvement Costs)         \$772,299.00	zation		5%			\$106,982.00	
Jälly Coordination/Relocation         \$\$33,491,00         LS.         \$\$33,491,00           Jälly Coordination/Relocation         \$%         \$100 ego 20.0         \$           Subtotal Additional Capital Improvement Costs         \$%         \$100 ego 20.0         \$           Subtotal Additional Capital Improvement Costs         \$%         \$	; Control		\$53,491.20	L.S.		\$53,491.00	
Stormware management vision Corror         5%         5106,382,00           Land Acquisition Costs         \$\$42,342,00         \$\$42,342,00           Cover Stormware Costs         \$\$7,927,920,00         \$\$106,392,00           Subtoal Addition Costs         \$\$7,927,920,00         \$\$106,392,00           Other Costs (percentage of Capital Improvement Costs)         \$\$127,229,00         \$\$127,229,00	Coordination/Relocation		\$53,491.20	L.S.		\$53,491.00	
Subtrail Additional Capital Improvement Costs         \$342,342,00           Land Acquisition Costs         \$7,927,920,00           Subtrail Land Acquisition Costs         \$7,927,920,00           Other Costs (percentage of Capital Improvement Costs)         \$7,927,920,00           Other Costs (percentage of Capital Improvement Costs)         \$7,927,920,00	water Management/Erosion Control		5%			\$106,982.00	
Land Acquisition Costs         67,927,920.00           Stablotal Land Acquisition Costs         \$7,927,920.00           Subtotal Land Acquisition Costs         \$7,927,920.00           Other Costs (percentage of Capital Improvement Costs)         60           Other Costs (Section 2000)         \$72,290.00	tal Additional Capital Improvement Cos	its				\$342,342.00	
Covir Leastments         \$7.927,920.00           Other Costs         \$7.927,920.00           Other Costs (percentage of Capital Improvement Costs)	Land Acquisition Costs					67.007.000.00	
Autor Augustator Posts Strate 2000 Strate	Easements					\$7,927,920.00	
Other Costs (percenting of opposing portenent COSts)	Other Costs (percentage of Cenite)	Improvement Costs)		_	_	\$1,927,920.00	
1070 Ø012,200.00	eering	Improvement Costs)	15%			\$372 299 00	
enal/Administrative 5% \$124,100,00	Administrative		5%			\$124 100 00	
Operative Antimicro         OP         OPERATION           Variant Advisition Management         10%         \$258,100.00	act Admin/Construction Management		10%			\$248,199,00	
25% \$\$200 \$\$	ndency		25%			\$620,498.00	
Subtral Other Costs \$1.365.096.00	otal Other Costs			r		\$1,365,096,00	
Total Capital Improvement Costs \$11,775,006,00	al Capital Improvement Cost	s				\$11 775 006 00	
	in oupital improvement costs	J				w11,773,003.00	

MAS	TER PLAN COST ESTI	MATE FOR INDIV	IDUAL RE	ACH		
PROJECT :	Boulder Creek MDP - Reach 9					
DRAINAGEWAY :	Boulder Creek			-		
REACH :	90					
JURISDICTION :	City of Boulder	Jaramu Dalaahar		DATE	2015 04 22	
REACH ID:	BCM-Reach9C	Jeremy Deischer		DATE :	2015-04-22	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	TOTAL COST	USER COMMENTS
Special Items (User Defined)						
Boulder Creek Pedestrian Bridges	<user defined="" items<="" td=""><td>2</td><td>EA</td><td>\$1,520,000.00</td><td>\$3,040,000.00</td><td></td></user>	2	EA	\$1,520,000.00	\$3,040,000.00	
	Master Plan Capital In	provement Cost Su	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Loncrete Box Culverts					\$0.00	
Hydraulic Structures		\$U.UU \$0.00				
Channel Improvements		\$0.00				
Deternion/Water Quality Facilities		\$0.00				
Landecaping and Maintenance Improvemente		\$0.00				
Special Items (User Defined)					\$3,040,000,00	
Subtotal Capital Improvement Costs					\$3.040.000.00	
Additional Capital Improvement Cos	its				**;***	
Dewatering		\$30,400.00	L.S.		\$30,400.00	
Mobilization		5%			\$152,000.00	
Traffic Control	-	\$45,600.00	L.S.		\$45,600.00	
Utility Coordination/Relocation		\$76,000.00	L.S.		\$76,000.00	
Stormwater Management/Erosion Control		5%			\$152,000.00	
Subtotal Additional Capital Improvement Cos	ts				\$456,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)	450/	1		8504 400 00	
Engineering		15%			\$524,400.00	
Legal/Administrative		5%			\$174,800.00	
Contingency		10%			\$349,000.00	
Subtotal Other Costs		23%			\$1,022,900,00	
Tala Constant Management Constant						
I otal Capital Improvement Cost	S				\$5,418,800.00	

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MA	1						
							-
PROJECT :	Boulder Creek Mi	OP - Reach 9					-
DRAINAGEWAT:	Bouider Creek						-
REACH .	SD City of Boulder						
BEACH ID:	BCM-Reach9D		Jeremy Deischer	1			
REACTIO.	Dem-reachab	2010 04 22	3				
DESCRIPTION			QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Pipe Culverts and Storm Drains	5						
Circular Pipes							
Diameter (in)	Length (ft)	No. of Barrels					
48-inch	750	1	750	L.F.	\$175.00	\$131,250.00	
Flare End Sections		1	T	1	1	1	
Diameter (in)	Applicable	No. of Barrels					
48-Inch	Yes	1	1	EA	\$2,506.00	\$2,506.00	
Channel Improvements							
Excavation, Low Range			2010	C.Y.	\$13.00	\$26,130.00	Earthwork
Special Items (User Defined)					-		
Asphalt Remove and Replace	<user defined="" iter<="" td=""><td>ns</td><td>2060</td><td>S.Y.</td><td>\$60.00</td><td>\$123,600.00</td><td>14th Street</td></user>	ns	2060	S.Y.	\$60.00	\$123,600.00	14th Street
Manhole Box Base	<user defined="" iter<="" td=""><td>ns</td><td>3</td><td>EA</td><td>\$7,000.00</td><td>\$21,000.00</td><td></td></user>	ns	3	EA	\$7,000.00	\$21,000.00	
Concrete for Weir Diversion	<user defined="" iter<="" td=""><td>ns</td><td>48</td><td>CY</td><td>\$730.00</td><td>\$35,186.00</td><td></td></user>	ns	48	CY	\$730.00	\$35,186.00	
		A 14 14					
	Master Pl	an Capital Improv	ement Cost Su	mmary			
Capital Improvement Costs						A	
Pipe Culverts and Storm Drains						\$133,756.00	
Likedraulic Structures						\$0.00	
Channel Improvements						\$26,130,00	
Detention/Water Quality Facilities						\$0.00	
Removals						\$0.00	
Landscaping and Maintenance Improvements						\$0.00	
Special Items (User Defined)						\$179,786.00	
Subtotal Capital Improvement Costs						\$339,672.00	
Additional Capital Improvement Co	osts						
Dewatering			\$3,396.72	L.S.		\$3,397.00	
Troffic Control			570 69.401.90	1.6		\$10,904.00	
Utility Coordination/Relocation			\$100.000.00	1.5.		\$100,000,00	
Stormwater Management/Erosion Control			5%			\$16,984.00	
Subtotal Additional Capital Improvement Co	sts					\$145,857.00	
Land Acquisition Costs							
ROW/Easements						\$0.00	
Subtotal Land Acquisition Costs						\$0.00	
Other Costs (percentage of Capita	I Improvement Costs)		1.001	1		<b>A</b> 110 <b>A</b> 10	
Engineering			15%			\$72,829.00	
Contract Admin/Construction Management			10%			\$24,276.00	
Contingency			25%			\$121.382.00	
Subtotal Other Costs						\$267,040.00	
Total Capital Improvement Costs							
Maste	r Plan Operation						
Description Quantity Unit Unit Cost Tota							
Culvert Maintenance (e.g. sediment & debris re	moval, erosion at entran	ce/exit, structural repairs,	e 750	L.F.	\$1.00	\$150.00	
Manhole and Inlet Maintenance (e.g. sediment	& debris removal, structu	ral repairs, etc.)	3	EA	\$61.00	\$37.00	
Hydraulic Structure Maintenance (e.g. debris re	emoval, erosion, structur	al repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Ma	aintenance Cost					\$309.00	
Effective Interest Rate						1.50%	
Total Operation and Maintenance Costs Over 50 Veers							

MAS						
						1
PROJECT :	Boulder Creek MDP - Reach 9					
DRAINAGEWAY :	Boulder Creek					
REACH :	9E					
JURISDICTION :	City of Boulder					
REACH ID:	BCM-Reach9E	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)	1					
Modify Ditch for Aquatic & Habitat Passage	<iser defined="" items<="" td=""><td>1</td><td>1.5</td><td>\$250,000,00</td><td>\$250,000,00</td><td></td></iser>	1	1.5	\$250,000,00	\$250,000,00	
Additional Improvements	<	1	1.5	\$100,000,00	\$100,000,00	
roundharmprotemente			2.0.	\$100,000.00	\$100,000.00	
	Master Plan Canital Impro	vement Cost Su	mmarv			
Canital Improvement Costs	master i fan Gapital inpre	Venient 60st out	initial y			
Pine Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$350,000,00	
Subtotal Capital Improvement Costs					\$350.000.00	
Additional Capital Improvement Co	sts					
Dewatering		\$3,500.00	L.S.		\$3,500.00	
Mobilization		5%			\$17,500.00	
Traffic Control		\$8,750.00	L.S.		\$8,750.00	
Utility Coordination/Relocation		\$8,750.00	L.S.		\$8,750.00	
Stormwater Management/Erosion Control		5%			\$17,500.00	
Subtotal Additional Capital Improvement Cos	sts				\$56,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
Engineering		15%			\$60,900.00	
Legal/Administrative		5%			\$20,300.00	
Contract Admin/Construction Management		10%			\$40,600.00	
Contingency		25%			\$101,500.00	
Subtotal Other Costs					\$223,300.00	
Total Capital Improvement Cost	S	\$629,300.00				
Maste	r Plan Operation and Maintenar					
Description		Total Annual Cost				
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Ma	intenance Cost				\$122.00	
Effective Interest Rate		1.50%				
Total Operation and Maintenan	ce Costs Over 50 Years				\$4,270.00	

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MASTER PLAN COST EST	MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH									
PROJECT : Boulder Creek MDP - Reach 9										
DRAINAGEWAY : Boulder Creek										
REACH : 9F	REACH : 9F									
JURISDICTION : City of Boulder										
REACH ID: BCM-Reach9F	Jeremy Deischer									
				TOTAL						
DESCRIPTION	QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS					
Master Plan Capital I	mprovement Cost Sun	nmary								
Capital Improvement Costs				1						
Pipe Culverts and Storm Drains				\$0.00						
Concrete Box Culverts				\$0.00						
Hydraulic Structures				\$0.00						
Channel Improvements				\$0.00						
Detention/Water Quality Facilities				\$0.00						
Removals				\$0.00						
Landscaping and Maintenance Improvements				\$0.00						
Special Items (User Defined)				\$0.00						
Subtotal Capital Improvement Costs				\$0.00						
Additional Capital Improvement Costs	\$0.00	1.6		\$0.00						
Dewatering	5%	L.3.		\$0.00						
Traffic Control	\$0.00	1.5		\$0.00						
Litility Coordination/Relocation	\$0.00	1.5		\$0.00						
Stormwater Management/Erosion Control	5%			\$0.00						
Subtotal Additional Capital Improvement Costs				\$0.00						
Land Acquisition Costs										
ROW/Easements				\$0.00						
Subtotal Land Acquisition Costs				\$0.00						
Other Costs (percentage of Capital Improvement Costs)										
Engineering	15%			\$0.00						
Legal/Administrative	5%			\$0.00						
Contract Admin/Construction Management	10%			\$0.00						
Contingency	25%			\$0.00						
Subtotal Other Costs				\$0.00						
Total Capital Improvement Costs	Total Capital Improvement Costs									
Master Plan Operation and Maint	enance Cost Summar	y								
Description	Total Annual Cost									
Sediment Removal (6 locations - 1x annually) <user defined="" items<="" td=""><td>1200</td><td>C.Y.</td><td>\$30.00</td><td>\$36,000.00</td><td></td></user>	1200	C.Y.	\$30.00	\$36,000.00						
Total Annual Operation and Maintenance Cost	\$36,000.00									
Effective Interest Rate				1.50%						
Total Operation and Maintenance Costs Over 50 Years				\$1,259,989.00						

MAS						
PROJECT :	Boulder Creek MDP - Reach 10					
DRAINAGEWAY :	Boulder Creek					
REACH :	10A					
JURISDICTION :	City of Boulder					
REACH ID:	BCM-Reach10A	Jeremy Deischer		DATE :	2015-04-22	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)	L					
Modify Ditch for Aquatic & Habitat Passage	lieer Defined Items	1	1.5	\$250,000,00	\$250,000,00	
moully Dicition Aquatic & Habitat Lassage			L.U.	ψ230,000.00	\$230,000.00	
	Master Plan Capital Improv	vement Cost Sur	nmarv			
Capital Improvement Costs	indotor i fair oupital impro-					
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention Mictor Quality Encilities					\$0.00	
Deternion/Water Quality Facilities					\$0.00	
Londoopping and Maintenance Improvements					\$0.00	
Candiscaping and Maintenance Improvements					\$0.00	
Special items (Oser Denned)					\$250,000.00	
Subtotal Capital Improvement Costs	ata				\$250,000.00	
Additional Capital Improvement Co	515	640 500 00	1.0		640 500 00	
Dewatering		\$12,500.00	L.S.		\$12,500.00	
Traffic Control		576	1.0		\$12,500.00	
Traffic Control		\$6,250.00	L.S.		\$6,250.00	
Stermuster Management/Eropics Control		30,230.00	L.O.		\$0,230.00	
Stornwater Management/Eroston Control		376			\$12,500.00	
Subtotal Additional Capital Improvement Cos	its				\$50,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs			_		\$U.00	
Other Costs (percentage of Capital	Improvement Costs)	450/			£45.000.00	
Engineering		15%			\$45,000.00	
Legal/Administrative		5%			\$15,000.00	
Contract Admin/Construction Management		10%			\$30,000.00	
Contingency		25%			\$/5,000.00	
Subtotal Other Costs		\$165,000.00				
Total Capital Improvement Cost	\$	\$465,000.00				
Maste	r Plan Operation and Maintenand					
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris re	moval, erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Ma	intenance Cost	\$122.00				
Effective Interest Rate					1.50%	
Total Operation and Maintenan	ce Costs Over 50 Years	\$4 270 00				

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MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH						
PROJECT :	Boulder Creek MDP - Reach 10					
DRAINAGEWAY :	Boulder Creek					
REACH :	10B					
JURISDICTION :	Boulder County					
REACH ID:	BCM-Reach10B	Jeremy Deischer		DATE :	2015-04-22	
r	1				r	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Special Items (User Defined)						
ERC Estimate Enhanced Stream	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$410,000.00</td><td>\$410,000.00</td><td></td></user>	1	L.S.	\$410,000.00	\$410,000.00	
ERC Estimate Riparian Restoration	<user defined="" items<="" td=""><td>1</td><td>L.S.</td><td>\$190,000.00</td><td>\$190,000.00</td><td></td></user>	1	L.S.	\$190,000.00	\$190,000.00	
	Master Plan Capital Improv	ement Cost Sur	mmarv			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$0.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$600,000.00	
Subtotal Capital Improvement Costs \$600,0					\$600,000.00	
Additional Capital Improvement Costs						
Dewatering \$6,000.00 L.S.				\$6,000.00		
Mobilization	obilization 5%				\$30,000.00	
Traffic Control		\$15,000.00	L.S.		\$15,000.00	
Utility Coordination/Relocation		\$15,000.00	L.S.		\$15,000.00	
Stormwater Management/Erosion Control 5%					\$30,000.00	
Subtotal Additional Capital Improvement Costs					\$96,000.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capita	Improvement Costs)	1001	1		A	
Engineering		15%			\$104,400.00	
Legal/Administrative		5%			\$34,800.00	
Contract Admin/Construction Management		10%			\$69,600.00	
Contingency Subtotal Other Casta		25%			\$174,000.00	
	-				\$362,000.00	
Total Capital Improvement Cost	S				\$1,078,800.00	
Maste	r Plan Operation and Maintenanc	e Cost Summar	у	1	1	
Description	and another than 0 and a second star.)	Quantity	Unit	Unit Cost	Total Annual Cost	
Channel Maintenance (e.g. sediment & debris n	emoval, erosion, tree & weed removal, etc.)	4800	L.F.	\$2.00	\$1,920.00	
I otal Annual Operation and Ma	Intenance Cost				\$1,920.00	
Effective Interest Rate	an Conto Over EO Venne				1.50%	
Total Operation and Maintenance Costs Over 50 Years				\$67,199.00		

MASTER PLAN COST ESTIMATE FOR INDIVIDUAL REACH						
	J.					
PROJECT : Bo	-					
DRAINAGEWAY : Bo	oulder Creek					
REACH : Di	tchForAquatic					
JURISDICTION : W	eld County					
REACH ID: BO	CM-ReachDitchForAquatic	Jeremy Deischer		DATE :	2015-04-27	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Grouted Boulders, 36"		763	S.Y.	\$231.00	\$176,253.00	
12-inch Riprap, Type M		37	C.Y.	\$73.00	\$2,682,00	
Excavation, Low Range		821	C.Y.	\$13.00	\$10,673.00	
Special Items (User Defined)						
Concrete Seepage Cutoff Wall <u< td=""><td>ser Defined Items</td><td>21</td><td>CY</td><td>\$730.00</td><td>\$15.009.00</td><td></td></u<>	ser Defined Items	21	CY	\$730.00	\$15.009.00	
Improvements to Diversion Structure <u< td=""><td>ser Defined Items</td><td>1</td><td>L.S.</td><td>\$45,000.00</td><td>\$45,000.00</td><td></td></u<>	ser Defined Items	1	L.S.	\$45,000.00	\$45,000.00	
	Master Plan Capital Impro	vement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts					\$0.00	
Hydraulic Structures					\$0.00	
Channel Improvements					\$189,608.00	
Detention/Water Quality Facilities					\$0.00	
Removals \$0.00					\$0.00	
Landscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$60,009.00	
Subtotal Capital Improvement Costs \$249,617.						
Additional Capital Improvement Costs						
Dewatering			L.S.		\$0.00	
Mobilization		5%			\$12,481.00	
Traffic Control			L.S.		\$0.00	
Utility Coordination/Relocation			L.S.		\$0.00	
Stormwater Management/Erosion Control 5%			\$12,481.00			
Subtotal Additional Capital Improvement Costs				\$24,962.00		
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital Improv	vement Costs)					
Engineering		15%			\$41,187.00	
Legal/Administrative		5%			\$13,729.00	
Contract Admin/Construction Management		10%			\$27,458.00	
Contingency		25%			\$68,645.00	
Subtotal Other Costs					\$151,019.00	
Total Capital Improvement Costs					\$425,598.00	
Master Pla	n Operation and Maintenan	ce Cost Summar	y			
Description		Quantity	Unit	Unit Cost	Total Annual Cost	
Hydraulic Structure Maintenance (e.g. debris removal, e	erosion, structural repairs, etc.)	1	EA	\$608.00	\$122.00	
Total Annual Operation and Mainten	nance Cost				\$122.00	
Effective Interest Rate					1.50%	
Total Operation and Maintenance Co	osts Over 50 Years	Total Operation and Maintenance Costs Over 50 Years				

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UD-MP Cost Version 2.2-Aquatic.xlsm, BCM-ReachDitchForAquatic

MAS	STER PLAN COST ESTIM	ATE FOR INDIV	IDUAL RE	ACH		
PRO JECT -	Reulder Creek Medity Ditch Diversi	on for Aquatic and Habitat	Decosta			_
DRAINAGEWAY	Boulder Creek - Modily Ditch Diversi		rassaye			-
DRAINAGEWAT .	CredeCentrel					-
REACH .	Wald Country					-
JURISDICTION :	RCM ReachCradeControl	loromy Dojechor		DATE	2015-04-27	1
REACH ID:	BCM-ReachGradeControl	Jerenny Deischer		DATE :	2013-04-27	
				1	TOTAL	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
Grouted Boulders, 36"		763	S.Y.	\$231.00	\$176.253.00	
12-inch Riprap, Type M		37	C.Y.	\$73.00	\$2 682 00	
Excavation, Low Range	1	821	C.Y.	\$13.00	\$10.673.00	
Special Home (Liser Defined)						
Concrete Seepage Cutoff	lear Defined Items	21	CY	\$720.00	\$15,220,00	
Soncrete Seepage Cuton	<oser delified="" items<="" td=""><td>21</td><td>GT</td><td>\$730.00</td><td>\$15,330.00</td><td></td></oser>	21	GT	\$730.00	\$15,330.00	
	Master Plan Capital Imp	provement Cost Sur	mmary			
Capital Improvement Costs						
Pipe Culverts and Storm Drains					\$0.00	
Concrete Box Culverts			\$0.00			
lydraulic Structures					\$0.00	
Channel Improvements					\$189,608.00	
Detention/Water Quality Facilities					\$0.00	
Removals					\$0.00	
andscaping and Maintenance Improvements					\$0.00	
Special Items (User Defined)					\$15,330.00	
Subtotal Capital Improvement Costs					\$204,938.00	
Additional Capital Improvement Co	sts					
Dewatering			L.S.		\$0.00	
Mobilization		5%			\$10,247.00	
Traffic Control			L.S.		\$0.00	
Jtility Coordination/Relocation			L.S.		\$0.00	
Stormwater Management/Erosion Control		5%			\$10,247.00	
Subtotal Additional Capital Improvement Cos	ts				\$20,494.00	
Land Acquisition Costs						
ROW/Easements					\$0.00	
Subtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
ingineering		15%			\$33,815.00	
egal/Administrative		5%			\$11,272.00	
Contract Admin/Construction Management		10%			\$22,543.00	
Contingency		25%			\$56,358.00	
Subtotal Other Costs					\$123,988.00	
					\$240,420,00	

MAS	TER PLAN COST ESTIM	ATE FOR INDIVI	DUAL RE	ACH		
PROJECT :	Boulder Creek Gravel Spillway					
DRAINAGEWAY :	Boulder Creek					
REACH :	MineralRd					_
JURISDICTION :	Boulder County					
REACH ID:	BCM-ReachMineralRd	JKD		DATE :	2015-03-23	
					TOTAL	
DESCRIPTION		QUANTITY	UNIT	UNIT COST	COST	USER COMMENTS
Channel Improvements						
irouted Boulders, 36"		540	S.Y.	\$231.00	\$124,740.00	
xcavation, Mid Range		880	C.Y.	\$29.00	\$25,532.00	Haul Required (Autocad Estimate)
oil Riprap, Type M		289	C.Y.	\$85.00	\$24,557.00	
xcavation, Low Range		712	C.Y.	\$13.00	\$9,256.00	Excavate and Backfill (CAD Estimate)
Special Items (User Defined)						
Concrete for Cutoff Walls	<user defined="" items<="" td=""><td>56</td><td>CY</td><td>\$730.00</td><td>\$40,588.00</td><td></td></user>	56	CY	\$730.00	\$40,588.00	
	Master Plan Capital Imp	provement Cost Sur	nmary			
Capital Improvement Costs					60.00	
Pipe Culverts and Storm Drains			\$0.00			
Contrate Box Cultures				\$0.00		
lydraulic Structures					\$0.00	
channel Improvements					\$184,085.00	
Detention/Water Quality Facilities					\$0.00	
kernovalis					\$0.00	
andscaping and Maintenance Improvements					\$0.00	
Special rems (User Denned)				\$40,588.00		
Subtotal Capital Improvement Costs	40				\$224,673.00	
Additional Capital Improvement Cos	15		1.6		\$0.00	
Anistation		5%	L.3.		\$0.00	
raffic Control		570	1.5		\$0.00	
Nile: Coordination/Delegation			L.O.		\$0.00	
Stormwater Management/Erosion Control		5%	L.3.		\$11,234,00	
autoral Additional Canital Improvement Cos	te	0,0			\$22,468,00	
Land Acquisition Costs					\$22,400.00	
OW/Easements					\$0.00	
ubtotal Land Acquisition Costs					\$0.00	
Other Costs (percentage of Capital	Improvement Costs)					
ngineering		15%			\$37,071.00	
egal/Administrative		5%			\$12,357.00	
Contract Admin/Construction Management		10%			\$24,714.00	
Contingency		25%			\$61,785.00	
Subtotal Other Costs					\$135,927.00	

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## **APPENDIX F**

**RIPARIAN ZONE AND THREATENED AND ENDANGERED SPECIES SUMMARY** 



## **Ecological Resource Consultants, Inc.**

35715 US Hwy. 40, Suite D204 ~ Evergreen, CO ~ 80439 ~ (303) 679-4820

### **Technical Memorandum**

**Date:** July 14, 2015

**ICON** Engineering To:

From: Dave Blauch, Diane Krzysztof (Ecological Resource Consultants, Inc.)

### Re: **Boulder Creek Watershed Master Plan Riparian Zone and Threatened and Endangered Species Summary**

During the historic regional flood event in September 2013, Boulder Creek experienced high peak flows for an extended duration which resulted in not only damages to infrastructure, but also widespread damages to the stream corridor. Roads and bridges overtopped, channel avulsions occurred, and questions arose regarding the best approach to rebuild infrastructure and restore Boulder Creek.

This memo, as part of the Boulder Creek Master Plan, specifically addresses the general condition of the existing riparian communities within the Boulder Creek corridor after the flooding and provides recommendations for re-establishment (or restoration) of the riparian zone as flood recovery efforts continue within the project area.

During the initial flood recovery efforts, emergency stabilization measures focused more on hardened methods such as riprap, grout, boulders and infrastructure repair. As the focus shifts towards long-term recovery, measures must also consider restoration of critical natural riparian and aquatic ecosystem function.

The importance of a well-developed riparian corridor is well documented. Well vegetated riparian corridors provide important terrestrial wildlife habitat, provide instream aquatic habitat benefits, stabilize soils and reduce problems from erosion, flooding and excessive nutrients. A properly functioning riparian corridor protects the physical integrity of the aquatic environment.

As part of ICON's team, ERC completed a cursory baseline assessment of the existing post-flood riparian corridor within the project area. The general condition of the existing riparian corridor was assessed including dominant vegetation community types remaining, species composition and primary vegetation strata that remain or that may have been damaged or lost. In addition, the assessment defined a typical "reference condition" riparian community or in other words the ideal natural riparian vegetation community that existed prior to the flood event and in an undisturbed state that should be the focus for





riparian restoration during long-term recovery efforts. Section 1.0 of this memo summarizes the riparian corridor existing conditions and long-term recovery recommendations.

The riparian corridor of the Boulder Creek project area also provides critical habitat that should be considered during flood recovery efforts. Section 2.0 of this memo includes a cursory screening of potential federal and state threatened and endangered species that may occur on or immediately surrounding the project area. Also included in this section is a summary of additional data reviewed for the project area including migratory birds, aquatic and macroinvertebrate data, wildlife closures and other important habitat management areas. This data is provided for reference, as-needed.

### SECTION 1.0 RIPARIAN ZONE ASSESSMENT

### **1.1 IMPORTANCE OF THE RIPARIAN ZONE**

A riparian corridor or "riparian zone" is defined as the transitional area or interface between upland terrestrial and aquatic habitats. A riparian zone is generally considered that portion of the landscape from the ordinary high water mark towards the adjoining uplands that affect or are affected by the presence of water (Figure 1). The riparian zone is often unique within a watershed containing notably different vegetation communities from the surrounding upland habitat. Properly functioning riparian zones of high ecological integrity contain an unfragmented, structurally diverse vegetation community, typically composed of three strata that includes trees, shrubs and grasses that are native to the region and that are adapted to the climatic, soil, and hydrologic conditions. The riparian zone has a variety of functions important to the stream or aquatic environment. Well vegetated riparian zones provide important terrestrial wildlife habitat, provide aquatic habitat benefits (shading, decreased water temperatures, biomass and instream cover), soil stabilization, and reduced problems from erosion, sedimentation and nutrients. Riparian vegetation also contributes to bank stability by dissipating the energy of moving water and reducing velocity, which is imperative during typical flood events. In an ideal situation, natural stream flows are able to access a broad floodplain. A properly functioning riparian zone protects not only water quality but also the physical integrity of the aquatic environment.



### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**

FIGURE 1. COMPONENTS OF A PROPERLY FUNCTIONING RIPARIAN ZONE. (IMAGE MODIFIED FROM FISRWG 1998.)



In general, the riparian zone width necessary to provide a particular level of function depends on the functions of the stream, the characteristics of the riparian zone, topography, intensity of adjacent land use, and overall watershed characteristics. The riparian zone is also often considered as a protective buffer to the aquatic system.

The City of Boulder prepared a report entitled Wetland and Stream Buffers: A review of the Science and Regulatory Approaches to Protection (April 2007) which summarizes that riparian zone or stream buffers adjacent to active stream channels provide important hydrological and ecological "rights-of-ways." Stream buffers maintain lateral connectivity between the streams and adjacent floodplains and uplands, as well as longitudinal connectivity up and down stream. The buffer width, length and vegetation composition are key features essential to establishing and maintaining health aquatic systems. Generally buffers that are wider, longer and more densely vegetated with herbaceous, shrub and tree layers provide more benefits than buffers that are narrower, shorter and sparsely vegetated with only herbaceous species. The report provides a summary of buffer widths recommended by the USEPA for various functions which indicates a

minimum width should be at least 50 feet and extend upwards of 200 feet from the stream edge. Error! Reference source not found. illustrates riparian buffer widths correlated to ecological function. Other scientific research has specifically evaluated the size of a riparian zone or buffer needed to adequately remove specific sediments, phosphorous, nitrogen, and other pollutants as well as provide effective wildlife protection (Environmental Law Institute 2008). Riparian zone widths for wildlife protection are typically the broadest and are based on how far individuals range from the waterbody for breeding or other lifecycle needs which can range from 33 feet to 5,000 feet, depending on the species (Environmental Law Institute 2003, Fischer 2000).





### **1.2 PROJECT AREA SETTING**

The project area comprises nearly 24 miles along Boulder Creek, extending from the confluence with Fourmile Creek, located within Boulder Canyon upstream of the City of Boulder, downstream to the confluence with the St. Vrain River, in the City of Longmont. The project area encompasses Boulder Creek and its adjacent floodplain through Boulder and Weld Counties.

The Boulder Creek project area generally lies within the South Central Semi-Arid Prairie ecoregion of the Great Plains; while a small portion of the upstream project reach occurs within the Northwestern Forested Mountain ecoregion of the Southern Rockies (USEPA Level III Ecoregions). The topographic elevation



ranges from approximately 5,700 feet above mean sea level (AMSL) at the confluence with Four Mile Creek within Boulder Canyon to approximately 4,800 feet AMSL at the downstream (east) end of the project area.

### 1.2.1 LAND USE AND VEGETATION COVER TYPES

Boulder Creek is a perennial stream which generally flows from west to northeast through the project area. The FEMA mapped 100-year floodplain has been used to generally define the project area boundary, which varies in width from approximately 150 feet wide at the upstream end to approximately 6,500 feet wide at the downstream confluence with the Saint Vrain River.

Existing land use and vegetation cover types were evaluated within the project area using mapping from the US Geological Survey (USGS) Southwest Regional Gap Analysis Project (SWReGAP) (2001). The predominant land cover type of the project area is cultivated cropland (42% of land) which includes grazing, alfalfa and other crop production. Aggregate mining of sand and gravel since the mid 1950's has visibly shaped the project area landscape as open water ponds scatter the floodplain, occupying approximately 16% of project area. Natural vegetation cover types within the riparian zone occupy only 27% of the project area and are mainly classified as Western Great Plains Riparian Woodland and Shrubland and to a lesser degree Western Great Plains Floodplain. Other land mapped within the project includes high and low density developed areas (12%) such as land within the City of Boulder, larger paved roads and other miscellaneous developments. Table 1 summarizes all land use types and vegetation communities mapped within the project area.

TABLE 1-LANDCOVER TYPES MAPPED WITHIN THE PROJECT AREA

Land cover Types	Percen Project
Cultivated Cropland	42
Western Great Plains Riparian Woodland and Shrubland	20
Open Water (Fresh) (i.e., abandoned gravel ponds)	16
Western Great Plains Floodplain	79
Developed, High Intensity	69
Developed, Low Intensity	69
Other	<1

### Source: SWReGAP 2001

\*Project Area defined by FEMA 100-year floodplain.

### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**





### 1.2.2 RIPARIAN ZONE VEGETATION COMMUNITY AND REFERENCE STANDARD

Of the vegetation cover types identified within the project area (SWReGAP 2001), the primary natural riparian zone vegetation community type that occurs within the project area is the Western Great Plains Riparian Woodland and Shrubland. This vegetation community type is most characteristic of habitats within the project area thus would be considered the reference standard or ideal natural community.

The Western Great Plains Riparian Woodland and Shrubland community type is found widely in the Great Plains of Colorado and occurs in wide river corridors that have low-gradient and primarily sandy/gravelly beds (becoming cobbly with increasing gradients). The type is most often found proximal to perennial rivers on low sidebars and streambanks near stream bankfull levels (NatureServe 2004). Because of its low position, the type is flooded frequently (average recurrence interval is 5 years). Dominant communities within this streamside system range from floodplain forests to wet meadows where properly functioning systems are linked by underlying soils and the flooding regime (FGDC 2008).

Within the project area, this reference standard community would occur on low terraces and along the immediate streambanks of Boulder Creek through the riparian zone. The unconfined, active stream channel would frequently inundate vegetation through the riparian zone and active floodplain forming a complexity of habitats which support a variety of plant communities. In a more undisturbed condition, vegetation would be continuous along the entire corridor and occupy three strata (i.e., overstory, midstory and understory). The riparian zone vegetation community would be dominated by open to moderately open tree canopy of plains cottonwood (25-50% cover) with thickets of narrowleaf willow in the mid-story. A dense herbaceous understory layer comprised of graminoids would be present along portions the streambanks above the ordinary high water mark. The overall herbaceous diversity would be high and predominantly native in composition. Subirrigated areas may support tallgrass meadow understory. The presence of narrowleaf willow indicates that the water table is relatively high and the community floods at least occasionally (E. Muldavin et al. 2006). Figure 3 depicts the components of a properly functioning and structurally diverse riparian community for Boulder Creek.



FIGURE 3. NATURAL RIPARIAN CORRIDORS OF HIGH ECOLOGICAL INTEGRITY TYPICALLY CONTAIN THREE DISTINCT LAYERS OF VEGETATION - OVERSTORY FOREST CANOPY OF TREES, MIDSTORY SHRUBS AND AN UNDERSTORY OF GRASSES



HABITAT - DOMINATED BY COTTONWOOD OVERSTORY WITH WILLOW MIDSTORY AND GRASS UNDERSTORY.



### **1.2.3 PROJECT AREA VEGETATION**

Within the project area, the existing riparian vegetation community is generally characteristic of the Western Great Plains Riparian Woodland and Shrubland community; however, the community is largely modified in vegetation structure, diversity and hydrologic regime from the ideal or reference standard community. The specific plant associations within the project area's riparian vegetation community can include dryer species typically associated with upland forests and cultivated fields/pastures to mesic species associated with scrub-shrub fringe wetlands, wet meadows or emergent marshes. Some locations within the project area can also differ from the reference standard in the number of vegetation strata present, the amount of non-native species and overall percent cover.

The riparian vegetation community of the project area is generally dominated by plains cottonwood (Populous deltoides) in the overstory layer, narrowleaf willow (Salix exigua) in the midstory layer and mixed mesic graminoids form the understory layer. In some areas, scattered shrubs such as snowberry (Symphoricarpos occidentalis), chokecherry (Prunus virginiana) or golden currant (Ribes aureum) can also found in the midstory. The herbaceous stratum is variable. Native grasses such as needle-and-thread grass (Stipa comata), wild licorice (Glycyrrhiza lepidota) occur in dryer areas, while sedge (Carex spp.) and rushes species (Juncus spp.) can occupy the understory near the immediate streambank. Introduced prairie grasses such as smooth brome (Bromus inermis), orchard grass (Dactylis glomerata) and meadow fescue (Festuca pratensis) are common in the project area. Non-native or weedy plants are common within the project area include Russian olive (Elaeagnus angustifolia), crackwillow (Salix fragilis), crested wheatgrass (Agropyron cristatum), reed canarygrass (Phalaris arundinacea) and cheatgrass (Bromus tectorum).

### 1.2.4 PROJECT AREA WETLANDS

A variety of wetland habitats do exist within the riparian zone of Boulder Creek. Wetlands and other waters of the US are regulated under Section 404 of the Clean Water Act (CWA). Future restoration and recovery efforts which result in disturbances to regulated areas may be subject to permitting and approval by the US Army Corps of Engineers (USACE), the US Environmental Protection Agency, and/or the US Fish and Wildlife Service (USFWS). A formal wetland delineation, by a gualified wetland consultant, and coordination with the USACE Denver Regulatory Office is recommended prior to implementation of any future restoration and recovery efforts to ensure CWA compliance. In addition, any future restoration and recovery efforts must comply with local wetland, stream and wildlife regulations.



### **1.3 RIPARIAN ZONE POST-FLOOD**

The existing condition of the riparian zone both pre- and post- flood varies across the project area and is largely influenced by historic and current land use practices. In general, the overall extent and condition of riparian habitat and value has been impacted more from historic land use practices than direct impacts from the flood. Land use including riparian vegetation removal, urban development, grazing, mining, stream channelization and establishment of non-native invasive vegetation have significantly shaped the character of the riparian corridor. In addition, land leveling, stream channelization, water diversions and levees reduce the extent and frequency of floodplain inundation, which further diminishes the quality and quantity of riparian vegetation (Anderson & Company Consulting Team 1998).

In these historically degraded areas, the riparian zone is narrow (<50 feet wide), fragmented and often dominated by non-native or weedy species. Higher quality riparian areas typically occur within the project in areas less impacted by human land use. In these areas, Boulder Creek's riparian zone is wide, stable and densely vegetated extending well over 500 feet across the floodplain. Refer to **Figure 4.** Example of varying riparian zone widths through the project area. The narrow riparian zone (left) is limited by land use and bisected by a railroad; the more naturalized

downstream section (right) is wide and less confined.

The overall development and extent of the riparian zone through the project area is closely correlated with existing landforms, land use practices and geomorphic processes. Therefore the structure of the riparian zone (shape/width) within the project area varies across topographic gradients from the steep canyon



FIGURE 4. EXAMPLE OF VARYING RIPARIAN ZONE WIDTHS THROUGH THE PROJECT AREA THE NARROW RIPARIAN ZONE (LEFT) IS LIMITED BY LAND USE AND BISECTED BY A RAILROAD; THE MORE NATURALIZED DOWNSTREAM SECTION (RIGHT) IS WIDE AND LESS CONFINED. (NOTE: EXAMPLE IS PROVIDED FOR RIPARIAN WIDTH CHARACTERISTICS ONLY -SITE SPECIFIC VEGETATION COMMUNITIES AND SPECIES MAY NOT REPRESENT AN APPROPRIATE RESTORATION TARGET.



FIGURE 5. PROJECT AREA REACHES.

slopes to the level landscape across the plains. The Boulder Creek riparian zone through the project area is characterized by four distinct reaches: Boulder Canyon, City of Boulder, Foothills to N 107th Street and N 107th Street to Saint Vrain Creek (Figure 5).



### **1.3.1 DISTURBANCES TO THE RIPARIAN ZONE**

Riparian zones by nature require regular flooding cycles to maintain their function. Certain vegetation species such as plains cottonwoods rely on regular flooding cycles for regeneration. However, extreme flood events can result in significant changes.

Floods can interact with vegetation in complex ways, both influencing and influenced by the structure and composition of the riparian zone (Johnson et al. 1999). The intensity of vegetation disturbance can be variable and influenced by factors such as pre-flood site conditions (i.e., type of vegetation present and channel constraints) and the interaction with flood dynamics (i.e., magnitude of flow and delivery of wood/sediment to a channel). Flood damage to riparian zone vegetation can occur by sediment and debris impact, scour or erosion of substrate or long-lasting change of hydrological conditions caused by changes in floodplain morphology and channel displacement. A less evident negative impact is a general decrease in plant vigor associated with post-stress reaction of plants to erosion (Toda et al. 2005). Flooding can damage trees indirectly by modifying soil characteristics. Extreme stream flows can wash away soil, exposing roots or deposit soil around a tree, smothering the roots. Generally, most trees and riparian vegetation damaged from flooding can recover in as little as one growing season; however, in other situations there may be no recovery at all. In addition, stressed trees can become more susceptible to secondary problems such as insect infestation or windthrow from the damaged root and trunk systems.

In several drainages effected by the 2013 flood event, the riparian zone was completely lost with removal of all soils and vegetation down to the underlying substrate. For example, the Little Thompson River, as described in the Little Thompson Watershed Restoration Master Plan (December 2014), exhibited some of the highest flow per square mile resulting in areas with almost total riparian zone loss. Figure 6 below depicts an example of nearly complete riparian zone loss on the Little Thompson River as a result of the 2013 flood event.



FIGURE 6. EXAMPLE OF NEARLY COMPLETE RIPARIAN ZONE LOSS: FROM LITTLE THOMPSON WATERSHED RESTORATION MASTER PLAN (DECEMBER 2014) [FIGURE 1.2 LITTLE THOMPSON RIVER AT BLUE MOUNTAIN NEIGHBORHOOD (FORMERLY X-BAR 7) BEFORE AND AFTER THE SEPTEMBER 2013 FLOOD.]



### **1.3.2 PROJECT AREA DISTURBANCES**

The existing (post-flood) riparian zone was evaluated within the project area reaches to determine the general overall effects from the September 2013 regional flood event. Overall, direct damage and loss to the riparian zone appears to be much less devastating than in other drainages affected by the flood event. For the most part, the riparian corridor of Boulder Creek remains intact and generally functioning with only relatively minor to moderate disturbance to the riparian zone.

Observed disturbance to the riparian zone varied throughout the project area reaches from minor or no impact within the more urban reaches which are designed to withstand higher peak flood flows; to more significant, moderate disturbances within downstream reaches which received higher volume of floodwater and debris flow from the upstream watershed. The effects included debris flows from the steep canyon reaches upstream that caused both bank erosion and sediment deposition in downstream riparian areas, along with conveyance and deposition of significant debris including boulders, trees, and household materials throughout the stream corridor. Within Boulder's city limits, significant maintenance was conducted post-flood to stabilize critically failing stream banks and to remove debris/sediment therefore these impacts appeared to be less severe through the project area.

The most significant impacts to the riparian zone observed in the project reaches are those areas where flood flows caused the stream to breach into nearby gravel ponds, completely abandoning the existing channel. This occurrence has altered the stream's connection to the original floodplain and riparian zone which will likely, over time, effect species diversity, abundance, structure, and functional characteristics of the riparian community.

Because the riparian zone is characterized by a distinct vegetation community that is physiologically adapted to a greater amount of available water (soil moisture, base flows, seasonal high flows and groundwater) than upland species, in areas where the available water has been altered, the reduced

available water will eventually cause riparian succession to a dryer, more xeric (upland) plant community. Species composition can change dramatically over a gradient of available water frequency and depths: existing vegetation along the stream channel that is adapted to wetter conditions can be replaced by species that are tolerant of drier conditions causing habitat community shifts and in some cases complete loss of riparian species (Stomberg et al. 1996) (Figure 7).



RIPARIAN ZONE

Specifically within the project area, the Western Great Plains Riparian Woodland and Shrubland community is both propagated by and maintained by, periodic flooding (Drake and Rolfsmeier 1995). Cottonwood trees which dominate the existing riparian zone are particularly dependent on shallow alluvial groundwater and stream flows and exhibit a range of drought-stress responses including morphological responses, dieback and in severe cases, mortality occurs (Rood et al. 2003, Williams and Cooper 2005). Studies suggest

9





that without frequent flood events, this riparian community type would likely transition into a grassland community type within 30 years post-flood, as the cottonwood and willow species would not regenerate (Bellah and Hulbert 1974). Conversely, in areas where the active channel may be re-aligned, existing vegetation which is accustomed to less available water (xeric conditions) may transition to species more tolerant of increased available water.

Under both scenarios, even slight changes in the channel alignment or flow patterns can alter the composition and quality of both riparian and upland vegetation communities. During restoration and recovery efforts special consideration should be taken to thoroughly understand the interaction and dependence of vegetation communities on any proposed changes to the channel alignment and flow patterns.

A summary of riparian zone post-flood conditions within the project area is presented as follows by reach.

### **Boulder Canyon Reach**

In this reach, the riparian zone is narrow (<100 feet wide) and confined between steep canyon walls and the adjacent Boulder Canyon Drive (Hwy 119) (Figure 8). Vegetation is largely comprised of one strata of trees or shrubs in the overstory with little or no understory vegetation present. The stream banks are steep and but with stable armored cobble/rock/riprap therefore lack midand understory strata.



Through the Boulder Canyon reach, fast moving floodwaters inundated the narrow but armored riparian zone which resulted in only low disturbances including tree/shrub damage/loss, localized bank erosion and steep slope failure and debris accumulation. The original channel retains a relatively stable (armored) stream bank. Overall, the limited existing riparian zone remains intact and functioning. Characteristics of the Boulder Canyon reach are shown in Photos 1-2.

### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**



FIGURE 8. BOULDER CANYON REACH OVERVIEW.









Photo 2. Boulder Canyon reach example of low post-flood shrub damage.

### **City of Boulder Reach**

This reach extends through the City of Boulder from approximately 5<sup>th</sup> Avenue to Foothills Parkway (Figure 9). High recreational use and an urban landscape setting characterize this reach, which limits the overall existing riparian habitat. The riparian zone varies in width from approximately 50-100 feet and is confined on both the north and south sides by commercial and residential development. Vegetation is typical of an urban



FIGURE 9. CITY OF BOULDER REACH OVERVIEW.

corridor and is largely comprised of mixed deciduous overstory trees with little or no understory vegetation present. Turf grass is common along portions of this reach. Stream access structures constructed of grouted riprap are present and reinforced cobble banks are common through this reach. For the most part Boulder Creek has been channelized and "locked in place" from urbanization.

Through this reach, Boulder Creek overtopped its banks and inundated the existing riparian zone. Disturbances to the riparian zone are generally low and include minor tree damage/loss, minor localized bank erosion and relatively moderate sediment and debris deposition. Much of the deposition has been removed through City of Boulder flood recovery efforts and therefore is less pronounced at this time. Postflood the riparian zone remains intact with little change the pre-flood condition therefore is anticipated to continue to function properly with little long-term adverse effects. Characteristics of the City of Boulder reach are shown in Photos 3-4.

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the pre-flood condition.

### Foothills to N 107th Street

This reach is comprised of mixed land ownership including private, City of Boulder and Boulder County. The majority of land within this reach is City and County designated open space including conservation easement lands. Abandoned gravel ponds characterize the landscape within this reach which historically altered the channel alignment and riparian corridor. Overall, the riparian corridor is less confined and wider than the canyon and City of Boulder reaches (extending 100 feet to over 1,000 feet across the floodplain), but existing conditions vary widely throughout this reach (Figure 10).

The overall extent and quality of riparian habitat through this reach varies greatly with the degree of historic land use disturbance, specifically stream channelization. Likewise, the amount of flood disturbance to the riparian zone also ranges from low to moderate through this reach based on the degree of floodplain connectivity associated with historic stream channelization.

In less disturbed sections of this reach where the stream channel is not confined and able to access the active floodplain, the riparian zone is well developed and comprised of cottonwood trees in the overstory with willow species in the midstory and a mixed herbaceous understory. In these areas, the stream was able to access the floodplain and riparian zone dissipating flood energy and lowering erosion potential; therefore,



**Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary** 

Photo 3. Highly urbanized area within City of Boulder reach Photo 4. City of Boulder reach example of low-disturbance: characterized by overstory trees and armored stream banks. debris accumulation and riparian zone tree damage (trunk Through this reach, Boulder Creek overtopped its banks and damage and bark removal) as a result of the flood. For the inundated the existing riparian zone. After the flood event, the most part, while damaged, a majority of the riparian riparian zone remains relatively intact with little change from vegetation community will persist and continue to function.



FIGURE 10. FOOTHILLS TO N 107TH STREET REACH OVERVIEW.



the post-flood disturbance to the riparian zone is low and includes only localized stream bank erosion/failure and/or tree damage/loss. In these low disturbance areas, the existing riparian zone remains intact and functioning.

In other areas where the stream is slightly modified (entrenched) but still able to access the bankfull stage, low terraces are present and dominated by one strata of trees/shrubs or herbaceous sedges/rushes/mesic grasses. In these sections of this reach, higher streamflows caused moderate disturbances including significant sediment deposition/vegetation burial, localized bank erosion, tree damage/loss and significant accumulation of debris from dead/downed trees through the riparian zone. For the most part, a majority of the riparian vegetation community remains intact and, while damaged, will persist and continue to function.

More degraded portions of this reach, which are confined by steep levees or significantly entrenched banks with no access to the active floodplain, are characterized by non-vegetated channel only with sparse overstory trees and upland herbaceous species present along the stream banks. In several locations, flood flows breached the original pre-flood channel and riparian zone resulting in new channel creation and flood flows through gravel ponds. In a few localized areas, specifically where the flood flows had eroded and breached the stream banks, the riparian vegetation is completely lost. In addition to the immediate disturbance to localized riparian vegetation, potential long-term impacts may occur within the abandoned channel and within overal associated riparian zone from alteration of stream flow which may result in vegetation community shifts or complete loss of riparian species. Characteristics of the Foothills to N 107th Street reach are shown in Photos 5-6.



**Photo 5.** Boulder Creek east from 61<sup>rd</sup> Street. Example of wide, well vegetated riparian zone with only moderate postflood disturbance to the riparian zone. At this location, flood flows deposited significant amounts of cobble material within the existing overly wide stream channel which resulted in altered stream flow. The riparian zone is now disconnected occurred in this reach, a majority of the riparian vegetation from stream flow which can result in long-term habitat remains intact and will continue to function. community shifts or complete loss of riparian species.



Photo 6. Boulder Creek near Valmont Road. Example of moderate post-flood disturbance to the riparian zone including: significant sediment deposition/vegetation burial, tree damage/loss and significant accumulation of debris from dead/downed trees. While moderate disturbance has



### N 107th Street to St. Vrain Creek Reach

County (Figure 11). Within Boulder County (N 107<sup>th</sup> Street to County Line Road), land ownership is predominantly Boulder County open space including conservation easement lands. Land use throughout the reach is largely cultivated cropland with some abandoned gravel ponds throughout. Existing conditions vary throughout this reach however disturbance from historic land use practices and other channel alterations is generally widespread.



Throughout most of the reach, the riparian corridor is narrow, less than 50 feet wide and confined between upland leveed berms with limited floodplain connection. Riparian vegetation occurs along a narrow stream bench and is comprised of midstory shrubs and herbaceous sedges/rushes/mesic grasses in the understory. Sparse clusters of cottonwood trees occur sporadically along the riparian corridor. Non-native or invasive species are common in these channelized areas. In other areas where the stream is less confined, the reach is characterized by a meandering stream channel, wide floodplain and a dense riparian community dominated by overstory cottonwood trees, midstory willow species and an understory of herbaceous sedges/rushes/mesic grasses. The downstream portion of this reach near the confluence with Saint Vrain Creek exhibits these characteristics of high quality habitat or the reference standard comprised of a dense vegetation community with three strata, stable stream banks, a wide floodplain and little human disturbance thus was considered to be a more typical reference standard habitat for the project.

Disturbance to the riparian zone varies widely through this reach. Overall, areas where the stream is less confined, well vegetated and able to access the floodplain exhibited less disturbance to the riparian zone. In these areas, the riparian zone remains intact and functioning. In more confined sections of this reach, impacts are moderate and include significant sediment deposition/vegetation burial, localized bank erosion, tree damage/loss and significant accumulation of debris from dead/downed trees through the riparian zone. For the most part, while moderate disturbances to the riparian zone occurred, a majority of the riparian vegetation community will persist and continue to function.

Additional disturbances associated with stream channel breaches that occurred through more confined sections of this reach as a result of extreme flood flows. In several locations, Boulder Creek breached its original pre-flood channel and riparian zone and now flows through gravel ponds. In the far downstream portion of this reach, Saint Vrain Creek also breached it's existing pre-flood channel resulting in flow alteration into gravel ponds and flow back into Boulder Creek, abandoning the historic channel. Where the breaches occured, immediate post-flood disturbance to the riparian zone includes localized riparian

This reach extends from N 107<sup>th</sup> Street in Boulder County to the confluence with St. Vrain Creek in Weld

FIGURE 11. N 107th Street to St. VRAIN CREEK REACH OVERVIEW.



vegetation loss. In addition, potential long-term impacts may occur within the abandoned channel or even within other adjacent riparian areas from alteration of hydrology (increase or decrease in available water) which may result in vegetation community shifts or complete loss of riparian species. Characteristics of the N 107th Street to St. Vrain Creek reach are shown in Photos 7-8.



Photo 7. Confluence with St. Vrain Creek. Example of flood flows resulted in minimal damage to the riparian an altered hydrologic regime. corridor.

Photo 8. N 107th Street to St. Vrain Creek reach. Here flood reference standard riparian habitat which includes dense flows resulted in abandonment of the pre-flood channel and vegetation community with three strata, stable stream riparian corridor. Herbaceous vegetation has begun to banks, a wide floodplain and little human disturbance. Here establish in the previous active channel bottom, indicative of



### **1.3.3 SUMMARY RIPARIAN ZONE POST-FLOOD**

Specific impacts to the riparian zone reaches through the project area include:

REACH	2013 REGIONAL FLOOD D
Boulder Canyon	<ul> <li>Low Disturbance</li> <li>Stable armored st</li> <li>Minor tree/shrub</li> <li>Minor localized ba</li> <li>Debris accumulati</li> <li>Channel remains i</li> <li>Limited existing ri</li> </ul>
City of Boulder	<ul> <li>Low Disturbance</li> <li>Stable armored st</li> <li>Minor tree damage</li> <li>Minor localized based</li> <li>Debris and sediment</li> <li>UDFCD.</li> <li>Channel remains in</li> <li>Limited existing right</li> </ul>
Foothills to N 107th Street	<ul> <li>Low to Moderate Disturba</li> <li>Significant sedime</li> <li>Localized bank ero</li> <li>Significant accume</li> <li>Stream breach intriparian zone aban</li> <li>Stream breach are species diversity, alteration of hydro</li> </ul>
N 107th Street to St. Vrain Creek	Low to Moderate Disturba Significant sedime Localized bank ere Significant accum Stream breach int riparian zone aba Stream breach are species diversity, alteration of hydr

Following are examples of pre- and post-flood conditions through the project area with examples of disturbances to the riparian zone.

### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**

### AMAGE – RIPARIAN ZONE

eam banks.

- damage/loss.
- nk erosion and steep slope failure.

on.

original alignment and connected to riparian zone. arian zone remains relatively intact.

eam banks.

- e/loss.
- nk erosion.
- ent deposition removed by City of Boulder, CDOT and
- original alignment and connected to riparian zone.
- arian zone remains relatively intact.

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nt deposition/vegetation burial.

sion.

- lation of debris from dead/downed trees.
- gravel ponds alteration of hydrology (channel and doned).
- as subject to potential long-term impacts to riparian abundance, structure, and functional characteristics from logy.

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nt deposition/vegetation burial.

sion.

- lation of debris from dead/downed trees.
- gravel ponds alteration of hydrology (channel and don).
- a subject to potential long-term impacts to riparian abundance, structure, and functional characteristics from logy.





Boulder Canyon reach pre-flood: narrow riparian zone confined between steep canyon walls and Boulder Canyon Drive (Hwy 119).



Example of low post-flood disturbance. In this area, localized stream bank erosion/slope failure occurred due to the narrow and confined riparian zone. A relatively small portion of the riparian corridor has been damaged while other portions remain intact. Overall, the riparian zone remains intact and functioning



**City of Boulder reach** pre-flood: riparian zone is confined on both the north and south sides by commercial and residential development. The stream channel is connected to the riparian zone which is vegetated by deciduous, riparian trees.



Example post-flood: This photo shows no significant change to the riparian zone post-flood, through a highly urbanized section through downtown Boulder. The stream was able to access the floodplain; armored stream banks and riparian tree root system functioned to withstand extreme flood flows limiting significant disturbances. The limited existing riparian zone remains relatively intact.

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Foothills to N 107th Street reach. Pre-flood conditions west of 61<sup>st</sup> Street. The blue line indicates the approximate preflood flow path of Boulder Creek. Through this section, the narrow riparian zone is confined by existing gravel ponds on either side.



Foothills to N 107th Street reach. Pre-flood conditions east of 61st Street. The blue line indicates the approximate pre-flood flow path of Boulder Creek.

**Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary** 

Example moderate post-flood disturbance, west of 61st Street. As a result of the flood, this section of Boulder Creek breached (yellow line) into an existing gravel pond. The historic riparian corridor is now disconnected from stream flow which can result in long-term habitat community shifts or complete loss of riparian species.





Example moderate post-flood disturbance, east of 61st Street. Extreme flood flows resulted in altered stream hydrology including a channel breach through an existing pond (yellow line) and abandoned side channel (blue arrow). Alterations in stream flow can result in long-term habitat community shifts or complete loss of riparian species.





Foothills to N 107th Street reach. Pre-flood conditions east of Example low post-flood disturbance, east of 75th Street. In 75th Street. In this less disturbed section of the reach. Boulder Creek is not confined, the riparian zone is well developed and able to access the active floodplain.



this section, the riparian zone had functioned properly by allowing flood flows to dissipate on the floodplain; therefore, the post-flood disturbance to the riparian zone is low and includes only localized stream bank erosion/failure and/or tree damage/loss. In these low disturbance areas, the riparian zone remains intact and functioning.



N 107th Street to St. Vrain Creek reach. Pre-flood conditions south of Hwy 119. Variable conditions along Boulder Creek (right, blue line). Saint Vrain Creek is shown on the left (green line). Portions of this reach are well vegetated and able to access the floodplain, while other areas are narrow and more confined as a result of historic gravel mining.



Example moderate post-flood disturbance, south of Hwv 119. Extreme flood flows through historically confined sections of Boulder Creek resulted in channel breach through existing gravel ponds (yellow line). A breach also occurred on Saint Vrain Creek (left, green line) which resulted in channel abandonment (orange line). As a result of the flood, the existing well vegetated riparian zone through this reach is threatened from altered stream flow which can result in longterm habitat community shifts or complete loss of riparian species.





### **1.4 RIPARIAN ZONE RESTORATION GUIDELINES**

The framework for any successful riparian zone restoration effort is understanding the local (reference standard) community that is either present or known to have existed in the local area, in order to restore the functional integrity and biodiversity of the riparian zone. As stated in the previous section, the reference community or primary habitat type recommended for restoration within this project area which is locally native and appropriate for the environmental setting is the Western Great Plains Riparian Woodland and Shrubland.

Replicating the natural characteristics of the local Western Great Plains Riparian Woodland and Shrubland habitat type including re-establishment of cottonwood tree overstory and a willow shrub mid-story with a mixed grassland understory that properly interacted with the channel flow should be the primary objective for natural restoration efforts.

Successful riparian zone restoration is dependent on a thorough understanding of numerous environmental factors and site-specific conditions. Stream flow, soil moisture, groundwater table, soil chemistry and sun-orientation are all critical elements to consider. Any restoration efforts should carefully consider such factors which should generally be defined by an expert to ensure greater success.

A number of references and guidance documents are available for restoration activities in Colorado and Boulder County. Please refer to the following for further guidance on riparian zone restoration and suggested native plants for revegetation within the project area:

Suggested Native Plants for Horticultural Use on the Front Range of Colorado. Boulder County Land Use **Department Publications.** http://www.bouldercounty.org/doc/landuse/p11nativeplants.pdf

City of Boulder Wetlands Protection Program Best Management Practices. City of Boulder Planning Department. May, 1995. Rule Adopted July, 1995. https://www-static.bouldercolorado.gov/docs/wetlands-proptection-program-bestmanagement-practices-1-201308011515.pdf

### Native Seed Mixes.

Boulder County Land Use Department Publications. http://www.bouldercounty.org/doc/landuse/p18nativeseedmix.pdf

Revegetation. Boulder County Land Use Department Publications. http://www.bouldercounty.org/doc/landuse/revegetationpacket.pdf

Native Plant Revegetation Guide for Colorado. Colorado Natural Areas Program; Colorado State Parks, Colorado Department of Natural Resources. October 1998.

https://cpw.state.co.us/Documents/CNAP/RevegetationGuide.pdf



Site-specific restoration plans can be developed which specify planting locations, soil amendments and appropriate species types. While site specific plans should be developed by experts, the following provides some generalized guidelines for restoration of the riparian zone within the project area.

### **Riparian Zone Restoration Guideline Summary**

- Natural riparian zone vegetation community type within the project area is characteristic of the Western Great Plains Riparian Woodland and Shrubland;
- A properly functioning riparian zone should have routine interaction with stream flows;
- In a more undisturbed condition, vegetation would be continuous along the entire corridor and occupy three strata (i.e., overstory, midstory and understory);
- Relatively dense native vegetation extending from the water's edge (bankfull) outward;
- Buffers that are wider, longer and more densely vegetated with herbaceous, shrub and tree layers provide more benefits. A minimum width should be at least 50 feet and extend upwards of 200 feet from the stream edge.

### **OVERSTORY – FOREST CANOPY ESTABLISHMENT**

Restoration or planting efforts should focus on re-establishing the overstory or forest canopy that has been lost. The plains cottonwood tree is one of the primary species of the forest canopy regionally as well as the largest tree reaching heights of up to 60 feet with trunk diameters of 2.5 feet. Cottonwoods are now primarily found along drainages and streams of the region. Cottonwood stands provide habitat for 82% of all bird species breeding in northeastern Colorado (Simonin 2001). This species establishes quickly under ideal conditions and is tolerant of frequent and prolonged flooding as well as seasonal low water conditions. Reproduction by seed is a primary means of cottonwood establishment (Hines 1999). The best conditions for establishment include moist, unvegetated mineral soils where the seedlings are not subject to significant erosion/deposition or prolonged flooding during the first growing season (Friedman et al., 1992) (Borman and Larson 2002) (Scott et al. 1997).

Other trees species that are appropriate in conjunction with cottonwoods may include those species listed in Table 2 below. The re-establishment of the forest canopy will provide significant bank stabilization benefits due to binding of soil with their roots and can also block or deflect high flow stream currents. Many of the large mature cottonwoods of the project area appear to be relatively stable after the September 2013 flooding, however many have been damaged and populations may start to decline over time. The planting of second generation stands of cottonwood and other species during recovery efforts will ensure the continued existence of this valuable habitat type. Special care should be taken during restoration to protect cottonwood seedlings that are newly established on flood exposed flats or deposits.

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TABLE 2. REPRESENTATIVE NATIVE RIPARIAN ZONE TREE SPECIES.				
Tree Species				
Scientific Name	Common Name			
Acer glabrum	Rocky Mountain maple			
Acer negundo	box elder			
Alnus incana	thinleaf alder			
Populus deltoides	plains cottonwood			
Salix amygdaloides	peachleaf willow			

\*All tree species should only be planted above the ordinary high water mark where moist soil conditions are present during a majority of the growing season.

Tree species are generally obtained from a commercial nursery as potted containers or balled and burlapped and are ideally planted during the latter part of the dormant season between February 1 and April 1, one to two weeks before budding stage. Tree planting efforts should also consider a monitoring and maintenance program that includes temporary irrigation, weed management and herbivory prevention.

### **MIDSTORY - SHRUBS ESTABLISHMENT**

Shrubs are considered one of the most valuable strata in a natural riparian zone. Shrubs generally form dense thickets with extensive root systems immediately along the water's edge and can tolerate fluctuating flows.

Willows are a widely-distributed shrub species throughout lower montane habitats in the region. Species can range from 6.5 to 20 feet tall forming large colonies with up to 95% cover. Roots of willows are wide and spreading, forming and extensive root system, especially with the development of large clones. Willow can be both drought resistant and very tolerant of flooding. The ability to generate new roots on the original root or submerged stem is important to riparian restoration. Narrowleaf willow, particularly, colonizes rocky, gravelly, and sandy stream edges, moist, well-drained alluvial terraces, and recently deposited sand and gravel bars that are below the high-water mark, where it is subject to annual flooding, and associated scouring and deposition (Anderson 2006). Where cottonwoods are not present, other willows may become the climax vegetation as narrowleaf willow communities promote bank building and soil development, preparing hospitable sites for other species (Anderson 2006). Midstory shrub species not only provide bank stability but also increased biomass, structural habitat and complexity for wildlife. Shrub species that are considered appropriate for native riparian zone restoration are listed in Table 3 below.

Shrub Species				
Scientific Name	Common Name			
Alnus incana	thinleaf alder			
Amelanchier alnifolia	western serviceberry			
Symphoricarpos occidentalis	western snowberry			
Prunus americana	wild plum			

### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**



Shrub Species			
Scientific Name	Common Name		
Rosa woodsii	Woods' rose		
Ribes aureum	golden currant		
Salix exigua	narrowleaf willow		

\*All shrub species should be planted above the ordinary high water mark where moist soil conditions are present during a majority of the growing season.

Shrub species are generally obtained from a commercial nursery in varying pot sizes from 1-quart to 5gallons and ideally planted during the latter part of the dormant season between February 1 and April 1, one to two weeks before budding stage. Shrub planting efforts should also consider a monitoring and maintenance program that includes temporary irrigation, weed management and herbivory prevention.

Willows species also have a unique ability to be harvested from onsite sources and installed as live stakes. Willow live staking consists of harvesting a cutting or single stem of a willow shrub. The stake is then inserted into the ground then will naturally root and develop above ground shoots.

### **UNDERSTORY - NATIVE HERBACEOUS**

An established understory community provides numerous environmental benefits including soil stabilization, overland runoff filtration as well as forage and cover for wildlife. During restoration efforts native seeding should focus on quickly establishing a groundcover to stabilize soil, minimize establishment of invasive species and promote long-term successional development. In restoration areas, the ground surface should be seeded with specialized riparian seed mix that promotes species diversity, contains locally native species that germinate rapidly and provides complete groundcover over a wide variety of hydrologic conditions. Generally in areas to be seeded, a minimum of 3 to 6 inches of suitable topsoil is recommended.

Refer to the following references for examples of native seed mixes.

Native grass seed mix specs from Boulder County NRCS - for loamy to clayey soils: http://www.coopext.colostate.edu/boulder/sam/pdf/BCLOAMY1.pdf

Native grass seed mix specs from Boulder County NRCS - for sandy soils: http://www.coopext.colostate.edu/boulder/sam/pdf/BCSANDY1.pdf

Native Seed Mixes. Samples for Boulder County: http://www.bouldercounty.org/doc/landuse/p18nativeseedmix.pdf



TABLE 4. REPRESENTATIVE NATIVE RIPARIAN ZONE HERBACEOUS SPECIES.						
Seed Mix						
Scientific Name	Common Name	Comments				
Achnatherum hymenoides	Indian ricegrass	Sandy, p/f, (FACU)				
Sporobolus airoides	alkali sacaton	Damp, alkaline, p/f, (FAC)				
Elymus canadensis	Canada wildrye	Disturbed sites, p/f, (FACU)				
Panicum virgatum	switchgrass	Marshes, prairies, foothills, p/f, (FAC)				
Pascopyrum smithii	western wheatgrass	Adaptable to variety of habitats, p,f, (FACU)				
Notes:						

Life Zones: p = Plains 4,000-6,000 feet; f = Foothills 6,000-8,000 feet; USACE Wetland Indicator Status: (FAC) = Facultative; (FACU) = Facultative Upland

### **1.5 NATIVE PLANT STOCK NURSERIES AND SEED SUPPLIER**

Following is a list of native riparian zone plant stock nurseries and seed suppliers considered appropriate for the project area. This list is not inclusive of all regionally available native plant suppliers.

A list of Colorado plant vendors can also be found on the Colorado Native Plant Society web page: http://conps.org/horticulture and restoration.html.

North Fork Native Plants	Conservation Seeding & Restoration, Inc. dba Rocky
1499 S 6000 W	Mountain Native Plants
Rexburg, ID 83440	3780 County Rd. 233
Phone: (208) 354-3691	Rifle, CO 81650-8740
http://www.northforknativeplants.com/	Phone: (208) 423-4835
	Toll-Free: (877) 423-4835
	http://www.csr-inc.com/
ittle Valley Wholesale Nursery	Arkansas Valley Seed
Little valley wholesale warsery	Arkansas valley seeu
13022 E 136th Ave	4333 Hwy 68
Brighton, CO 80601	Longmont, CO 80504
Phone: (303) 659-6708	Phone: (877) 907-3337
https://www.lvwn.com/	www.avseeos.com
Pawnee Buttes Seed	Western Native Seed
805 25th Street	P.O. Box 188
Greeley, CO 80632	Coaldale, CO 81222
Phone: (970) 782-5947	Phone: (719) 942-3935
www.pawneebuttesseed.com	www.westernnativesed.com

e valley wholesale nursery	
22 E 136th Ave	
nton, CO 80601	
ne: (303) 659-6708	
<u>s://www.lvwn.com/</u>	

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### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**



### SECTION 2.0 THREATENED AND ENDANGERED SPECIES

ERC conducted a preliminary screening for federal and state threatened and endangered species within the project area. It will be important during long-term recovery and restoration efforts that protected species and habitats are considered. Close coordination with the agencies mentioned below is recommended.

Federal or state listed threatened and endangered species and/or habitat protected under the Endangered Species Act (ESA) or by the Colorado Parks and Wildlife (CPW) under Colorado Statute Title 33 are summarized as follows. Raptor nest sites are further protected by the US Fish and Wildlife Service (UFWS)/CPW under the Migratory Bird Treaty Act (MBTA) therefore the applicable regulatory requirements are also summarized subsequently.

Additionally, ERC review aquatic habitat data for the project area from the CPW and macroinvertebrate data from the City of Boulder: Boulder Habitat Assessment Report (CDM Smith 2014) City of Boulder which are briefly summarized in the following section.

The City of Boulder Open Space and Mountain Parks (OSMP) maintains land restrictions and seasonal wildlife closures throughout the project area pursuant to City Municipal Code, B.R.C. 1981. Additionally, Boulder County has identified important environmental resources and habitat areas that should be considered in land use decisions and preserved through management practices as summarized in the Boulder County Comprehensive Plan (BCCP) (Second Addition 1996, As Amended). These ecologicallysignificant areas are utilized by reference in the Boulder County Land Use Code are protected through administration of the Code and in conformance with applicable federal and state law. A summary of these areas follows.

### 2.1 SPECIES PROTECTED UNDER THE ENDANGERED SPECIES ACT (ESA) OF 1973

The ESA of 1973 was enacted by the United States to conserve endangered and threatened species and the ecosystems that they depend on. Under the ESA, species may be listed as either "endangered" or "threatened"; both designations are protected by law. The ESA is administered by the USFWS. The USFWS has developed project specific species lists, available online by request, identifying threatened, endangered, and proposed species, designated critical habitat, and candidate species protected under the ESA that may occur within the boundary of the proposed project and/or may be affected by the proposed project (USFWS 2014). Eleven species are identified to occur or historically occur within range of the project area in Boulder County (USFWS 2014). No USFWS critical habitat is present within or near the potential project areas. Further evaluation of the eleven species' distribution and habitat requirements indicates that three species potentially occur within range of the project area (Table 5). During restoration and recovery efforts coordination with the USFWS is recommended.

US Fish and Wildlife Service – Ecological Services Field Office

P.O. Box 25486 Denver Federal Center (MS 65412) Denver, Colorado 80225



Table 5. Federal Threatened or Endangered Species.					
Common Name	Scientific Name	*Status	Occurrence		
Canada lynx	Lynx canadensis	FT	Suitable habitat not present.		
Greenback cutthroat trout	Oncorhynchus clarki stomias	FT	Suitable habitat not present.		
Mexican spotted owl	Strix occidentalis lucida	FT	Suitable habitat not present.		
Interior Least tern	Sternula antillarium	FE	Water depletion species.		
Pallid sturgeon	Scaphirhycchus albus	FE	Water depletion species.		
Piping Plover	Charadrius melodus	FT	Water depletion species.		
Western prairie fringed orchid	Platanthera praeclara	FT	Water depletion species.		
Whooping crane	Grus americana	FE	Water depletion species.		
Preble's Meadow Jumping Mouse	Zapus hudsonius preblei	FT	Suitable habitat may be present.		
Ute Ladies'-tresses	Spiranthes diluvialis	FT	Suitable habitat may be present.		
Colorado Butterfly Plant	Guara neomexicana spp.	FT	Suitable habitat may be present.		
*Status: FT - Federally Listed Threatened FE - Federally Listed Endangered					

Suitable habitat not present. These federally listed threatened and endangered species are identified to occur within the Boulder/Weld Counties. However, these species are not known to exist within the specific vicinity of the project area and/or have specific habitat requirements (i.e., elevation range) that are not common in the vicinity of the project area. The species are not likely to occur within the project area and therefore, restoration and recovery efforts would not likely adversely affect the continued existence or available habitat of the species.

Water depletion species. The USFWS under the ESA has determined that water depletions in the South Platte River Basin are considered an adverse effect to these species. The project area is considered to be located within the South Platte River Basin; therefore, coordination with the USFWS would be necessary to determine whether a project would fall under a water-related activity/use.

Suitable habitat may be present. Within the project area along Boulder Creek, potential suitable habitat may be present for these species. Potential habitat includes well-developed riparian vegetation along Boulder Creek. The project area is not designated as Critical Habitat by the USFWS (CPW 2013).



PMJM: The project area does not occur within the PMJM Block Clearance Zone. PMJM are not known to occur within the project area (UDFCD 2010) and the nearest known population of PMJM occurs to the south of the project area on South Boulder Creek; however, the riparian corridor of the project area may provide suitable habitat for this species.

Colorado Butterfly Plant: This plant species is a short-lived, perennial herb endemic to moist soils in mesic or wet meadows of floodplain areas in southeastern Wyoming, north central Colorado, and extreme western Nebraska. Potential habitat for this species exists along the Boulder Creek stream channel and in the mesic or wet meadow floodplain areas.

Ute Ladies'-tresses: The Ute ladies-tresses occurs in seasonally moist soils and wet meadows near springs, lakes, or perennial streams and their associated floodplains below 6,500 feet in elevation in certain areas of Utah, Colorado, Idaho, Wyoming, and Nevada. Potential habitat for this species exists along the riparian corridor of Boulder Creek.

It is recommended that before a project is commenced, site specific surveys and more detailed analysis are conducted to determine the existence of potential habitat for the species.

In support of flood recovery efforts, the USFWS recommends implementation of conservation measures from the Recommended Conservation Measures to Avoid and Minimize Impacts to the Preble's Meadow Jumping Mouse, the Ute Ladies'-tresses, and the Colorado butterfly plant from Emergency Flood Response Activities Along Streams, Rivers, or Transportation Corridors. Information can be found online at: http://www.fws.gov/endangered/esa-library/index.html#consultations.

### STATE THREATENED AND ENDANGERED SPECIES

Species identified as state threatened or endangered are protected by the CPW under Colorado Statute Title 33. State regulations prohibit "any person to take, possess, transport, export, process, sell or offer for sale, or ship and for any common or contract carrier to knowingly transport or receive for shipment" any species or subspecies listed as state endangered or threatened. State listed threatened and endangered species were screened as potential inhabitants of the project area based on general habitat requirements and CPW information (CPW 2014), Colorado Listing of Endangered, Threatened, and Wildlife Species of Special Concern. Seventeen species are identified to occur or historically occur within the project area (CPW 2014). Further evaluation of the seventeen species' distribution and habitat requirements indicates that five species (PMJM, Ute ladies'-tresses, Colorado butterfly plant, burrowing owl and river otter) potentially occur within range of the project area. Three of these species are also federally listed by the USFWS therefore are summarized in the previous section (Table 5). State listed species which also occur on the USFWS federal list, as screened above, were not duplicated below.

Colorado Parks and Wildlife – Northeast Region Office 6060 Broadway Denver, Colorado 80216 Telephone: (303) 291-7227



http://cpw.state.co.us/aboutus/Pages/ContactUs.aspx

TABLE 6. STATE THREATENED OR ENDANGERED SPECIES.					
Common Name	Scientific Name	*Status	Occurrence		
Boreal Toad	Bufo boreas	SE	Suitable habitat not present.		
Burrowing owl	Athene cunicularia	ST	Suitable habitat may be present.		
Southwestern willow flycatcher	Empidonax traillii extimus	SE	Suitable habitat not present.		
Lesser prairie-chicken	Tympanuchus pallidicinctus	ST	Suitable habitat not present.		
Plains sharp-tailed grouse	Tympanuchus phasianellus jamesii	SE	Suitable habitat not present.		
Arkansas darter	Etheostoma cragini	ST	Suitable habitat not present.		
Bonytail	Gila elegans	SE	Suitable habitat not present.		
Brassy minnow	Hybognathus hankinsoni	ST	Suitable habitat not present.		
Colorado pikeminnow	Ptychocheilus lucius	ST	Suitable habitat not present.		
Common shiner	Luxilus cornutus	ST	Suitable habitat not present.		
Greenback cutthroat trout	Oncorhynchus clarki stomias	ST	Suitable habitat not present.		
Humpback chub	Gila cypha	ST	Suitable habitat not present.		
Lake chub	Couesius plumbeus	SE	Suitable habitat not present.		
Northern redbelly dace	Phoxinus eos	SE	Suitable habitat not present.		
Plains minnow	Hybognathus placitus	SE	Suitable habitat not present.		
Razorback sucker	Xyrauchen texanus	SE	Suitable habitat not present.		
Rio grande sucker	Catostomus plebeius	SE	Suitable habitat not present.		
Southern redbelly dace	Phoxinus erythrogaster	SE	Suitable habitat not present.		
Suckermouth minnow	Phenacobius mirabilis	SE	Suitable habitat not present.		
Black-footed ferret	Mustela nigripes	SE	Suitable habitat not present.		
Gray wolf	Canis lupus	SE	Suitable habitat not present.		
Grizzly bear	Ursus arctos	SE	Suitable habitat not present.		
Kit fox	Vulpes macrotis	SE	Suitable habitat not present.		
Lynx	Lynx canadensis	SE	Suitable habitat not present.		
River otter	Lontra canadensis	ST	Suitable habitat may be present.		
Wolverine	Gulo gulo	SE	Suitable habitat not present.		
*Status: ST - State Listed Threatened SE - State Listed Endangered					



Suitable habitat not present. These state listed threatened and endangered species are identified to occur within the state. However, these species are not known to exist within the specific vicinity of the project area and/or have specific habitat requirements (i.e., elevation range) that are not common in the vicinity of the project area. The species are not likely to occur within the project area and therefore, restoration and recovery efforts would not likely adversely affect the continued existence or available habitat of the species.

Suitable habitat may be present. Within the project area along Boulder Creek, potential suitable habitat may be present for these species.

Burrowing owl: The burrowing owl is a breeding species across the plains of eastern Colorado. Potential nesting habitat for the burrowing owl includes abandoned burrows, especially prairie dog colonies, located in grassland or agricultural lands from late March through October. The presence of prairie dog colonies (although active) within the project area exhibits general characteristics that are considered potential burrowing owl habitat. Any land use changes that disturb prairie dog colonies from March 1st through October 31st should ensure burrowing owls are not adversely affected.

River otter: Otters live in riparian habitat. Populations of this species have been historically rare in Colorado however since the 1970's, the CPW has focused on reintroduction efforts. Within the project area, the first river otter in approximately 100 years was documented on Boulder Creek, east of downtown Boulder on March 7, 2014. Therefore, segments of Boulder Creek maybe considered potential habitat for the otter.

During restoration and recovery efforts coordination with the CPW is recommended.

### 2.1 MIGRATORY BIRD TREATY ACT

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 730-712). The MBTA makes it illegal for anyone to take, possess, import, export, transport, sell, purchase barter, or offer for sale, purchase, or barter any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. In Colorado, all birds except for the European starling (Sturna vulgaris), house sparrow (Passer domesticus), rock dove (Columba livia) and common grouse/pheasant species (Order Galliformes) are protected under the MBTA. A total of 523 migratory bird species are known to occur in the Mountain-Prairie Region (USFWS Region 6, Montana, Wyoming, Utah, North Dakota, South Dakota, Nebraska, Kansas and Colorado); 320 of the 523 migratory bird species are known to breed in USFWS Region 6.

 Based upon literature review and an onsite assessment of the project area, ERC has determined that some migratory birds likely utilize the project area. These birds are protected under the MBTA, and killing or possession of these birds is prohibited. Future recovery and restoration efforts which remove vegetation should first ensure that active nests are not disturbed. Generally, the active nesting season for most migratory birds in this region of Colorado occurs between April 1 and August 31.



- and consult with the CPW.
- within the project area.
- project area.

### 2.2 AQUATIC LIFE

Boulder Creek throughout the project area is classified as Water Supply Recreation 1A Agriculture Aquatic Life Warm 1 by CDPHE. Aquatic Life Warm 1 classification indicates the waters are currently capable of sustaining a wide variety of warm water biota, including sensitive species. Waters shall be considered capable of sustaining such biota where physical habitat and, water flows or levels and water quality conditions result in no substantial impairment of the abundance and diversity of species.

Informal discussions with local Colorado Parks and Wildlife (CPW) staff indicates that the project reach of Boulder Creek is a transitional zone between a cold water fishery (extending upstream of Boulder Canyon) dominated by trout to a warm water fishery (downstream of Boulder Canyon) dominated by native minnow species. Brown trout are present through the Canyon and City reaches, however east of 75<sup>th</sup> Street small bodied native fish become more dominate. CPW also indicated that future restoration efforts in the project reach and in particular east of 75<sup>th</sup> Street should focus on native small bodied native fish species and not typical trout habitat. CPW's most recent fish population survey (2014), identified the following dominant species: brown trout, common carp, creek chub, fathead minnows, green sunfish, largemouth bass, longnose dace, longnose sucker and white sucker. Of the 17 species collected, 9 species were nonnative and 8 species were native to South Platte River basin.

CDM Smith completed a City of Boulder - Boulder Creek Habitat Data Review (Draft 2014) in anticipation of: a) the inclusion of habitat and biological data in future assessments and potential impairment determinations, and b) the importance of understanding habitat quality as part of the biological assessment process. The primary objective of the study was to organize the city's habitat data in a manner that supports meaningful evaluation of macroinvertebrate data that may be used to support aquatic life

### **Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary**

• In addition, disturbance to raptor nest sites is further protected by the CPW. The CPW guidance document (Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors) provides recommended tolerance limits or buffer zones for various species of raptors in addition to seasonal restrictions in response to human activity. Within the project area, available CPW Species Activity Mapping (SAM) depicts known mapped buffer zones within the project area for bald eagle (Haliaeetus leucocephalus) and osprey (Pandion haliaetus) (NDIS 2013). Seasonal restrictions for these species can be obtained from the CPW (2008) guidance document: https://cpw.state.co.us/Documents/WildlifeSpecies/LivingWithWildlife/RaptorBufferGuidelines2 008.pdf. Future recovery and restoration efforts should also be aware of any new raptor nest sites

 CPW SAM mapping depicts great blue heron (Ardea herodias) nesting areas throughout the project area. The great blue heron is considered a Colorado species of special concern, protected under the MBTA. The rookery (nesting) areas are considered important habitat features for conservation

• Refer to Figure 12 in Section 2.4 for a map which depicts CPW nest sites within vicinity of the



use attainment determinations in the Boulder Creek watershed. This study was also used to develop recommendations for streamlining future habitat characterization efforts so that in the future, monitoring resources are expended on the collection of the most useful habitat data. The Review study area begins in the canyon at the west end of the urban core and extends to the confluence of Boulder Creek and Coal Creek near the Boulder/Weld County line. The Review concluded that datasets show lower habitat quality through the City as seen in the habitat scores below the canyon through 28th Street. Associated biological indices also follow the general pattern of lower scores at 28th Street. Urban density begins to decrease east of Foothills Parkway and habitat scores and biological metrics generally improve as the area becomes more rural. Habitat subcategory scores show that the overall habitat results are driven by habitat scores related to riparian quality. Of particular note is habitat parameter 10, which scores vegetative riparian zone width. Scores are lower through the urban corridor where the riparian zone is most confined.

### 2.4 CITY OF BOULDER'S OPEN SPACE & MOUNTAIN PARKS (OSMP) CLOSURES

The City of Boulder's Open Space & Mountain Parks land has been set aside for preservation and the protection of the natural environment. Within the project area, the Open Space and Mountain Parks (OSMP) division maintains the following closures (Figure 12).

- Bald Eagle Closures Nov. 1 July 31. One area on OSMP land is closed from Nov. 1 to July 31 every year to protect bald eagle nesting and roosting activity.
- New Zealand Mudsnail Closures Year Round. Portions of Boulder Creek downstream of Valmont Road are closed year round because of the non-native, invasive New Zealand Mudsnail.







**Boulder Creek Master Plan Riparian Zone and Threatened and Endangered Species Summary** 

FIGURE 12. CPW NEST SITES AND OTHER CLOSURES.



### 2.5 BOULDER COUNTY OPEN SPACE (BCPOS) COMPREHENSIVE PLAN

The Boulder County Comprehensive Plan (BCCP) identifies important environmental resources and habitat areas that should be considered in land use decisions and preserved through management practices (Second Addition 1996, As Amended). The designated areas include areas: environmental conservation areas, wetlands, critical wildlife habitat, rare plant areas, habitat connectors and natural areas/landmarks. A map depicting key habitat areas from the BCCP update is provided below as Figure 13. These ecologicallysignificant areas are referenced in the Boulder County Land Use Code and should be considered in future project planning. The BCCP Update can be accessed online:

http://www.bouldercounty.org/property/build/pages/bccpupdate.aspx



FIGURE 13. BOULDER COUNTY COMPREHENSIVE PLAN UPDATE - KEY HABITAT AREAS.



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