

## APPENDIX A

### INSPECTION FORMS

# DAM SAFETY INSPECTION REPORT

**NAME OF DAM:** Cowpath Dam


**DATE:** 6/8/2021

Dam Inspected By: Brad Koon, P.E.  
Owner Representative:  
Weather: Partly Cloudy



Inventory No: MT-3203  
Hazard Category: High Downstream  
Hazard Potential  
Type of Dam: Rolled Earth  
Embankment  
Year Built: 1966-67  
Year Rehabilitated: N/A

Owner: City of Shelby  
Operator: City of Shelby

RESERVOIR STORAGE STATUS		
	Water Surface Elevation (Feet)	Storage (Acre-Feet)
At Time Of Inspection		
At Spillway Crest:	3356	1670
At Min Dam Crest Elevation:	3363	2480 with Sullivan
		

## 1. Embankment

### A. Crest

Height: 49

Width: 18

Length: 1425

Surface: Earthwork

#	ITEM	YES	NO	REMARKS
1	Settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Misalignment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Longitudinal Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Traffic or Roadway Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4 Animal burrows observed
7	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Some bare spots in vegetation

### B. Upstream Face

Upper Slope Ratio: 1:3

Lower Slope  
Ratio: 1:3

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Very small amount of erosion on right groin
2	Longitudinal Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Adequate Riprap Protection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
5	Riprap Deterioration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6	Settlement/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Slumps/Sloughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Nuisance Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 tree on right side; 2 small tree middle of right pond
9	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Small muskrat path and hole at bottom of face
10	Debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Barbed wire and scrap metal on upstream face
11	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### C. Downstream Face

Slope Ratio: 2:1

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor erosion on left groin
2	Longitudinal Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Settlement/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Slumps/Sloughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Adequate Vegetation Cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

8	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Animal Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11	Other	<input type="checkbox"/>	<input type="checkbox"/>	

## 2. Abutment and Toe

### A. Downstream Toe

#	ITEM	YES	NO	REMARKS
1	Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Depressions/Bulges	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Boils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Toe Drain in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>	Not able to observe
5	Toe Drain Flowing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
6	Relief Wells Flowing	<input type="checkbox"/>	<input type="checkbox"/>	N/A
7	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rodent holes observed
9	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### B. Upstream Abutment

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor erosion left groin
2	Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Slides/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Sinkholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rodent holes observed
7	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### C. Downstream Abutment

#	ITEM	YES	NO	REMARKS
1	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Slides/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Drains Flowing	<input type="checkbox"/>	<input type="checkbox"/>	N/A
6	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rodent holes observed
8	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Other	<input type="checkbox"/>	<input type="checkbox"/>	



### 3. Downstream Condition

### A. Downstream Land Use

## Recreation and Residential

#### 4. Spillway (Earthen Chute)

### A. Earthen Chute/Downstream channel

Accessible: Via Vehicle Channel Width: 46 Feet Side Slopes: 1V to 2H

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Scarping on Channel Bank – North End
2	Obstructions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Deposition of Material	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Nuisance Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Small Tree in spillway between to segments of Cowpath; some unvegetated areas
6	Animal Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Water standing in channel @ end of spillway pipe outlet

Report completed by: Brad Koon, Triple Tree Engineering

## RECOMMENDATIONS

### Maintenance/Repair

[illegible]

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# DAM SAFETY INSPECTION REPORT

NAME OF DAM: Sullivan

DATE: 6/8/21

Dam Inspected By: Brad Koon P.E.  
Owner Representative:  
Weather: Partly Cloudy



Inventory No: MT-2004  
Hazard Category: High Downstream  
Hazard Potential  
Type of Dam: Rolled Earth  
Embankment  
Year Built: 1966-67  
Year Rehabilitated: N/A

Owner: Town Of Shelby  
Operator: Town of Shelby

RESERVOIR STORAGE STATUS		
	Water Surface Elevation (Feet)	Storage (Acre-Feet)
At Time of Inspection:		
At Spillway Crest:	3341	1670
At Min Dam Crest Elevation:	3356	2480 Combined with Cowpath



## 1. Embankment

### A. Crest

Height: 49'

Width: 18'

Length: 750'

Surface: Earthwork

#	ITEM	YES	NO	REMARKS
1	Settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Misalignment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Longitudinal Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Traffic or Roadway Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Small old auto track 2" deep
6	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	19 Animal burrows observed
7	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Limited vegetation on surface – 8' wide vegetation on sides
9	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### B. Upstream Face

Upper Slope Ratio: 3:1

Lower Slope  
Ratio: 3:1

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor Erosion Left Groin
2	Longitudinal Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Adequate Riprap Protection	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Good condition with rocks 6" – 3'
5	Riprap Deterioration	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Settlement/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Slumps/Sloughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Nuisance Vegetation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Very good vegetation with native grass; Remove 3 trees (1 north abutment, 1 south abutment, 1 in water)
9	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3 Animal burrows observed
10	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11	Other	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Grease Structure and install cap on threads

### C. Downstream Face

Slope Ratio: 2:1

#	ITEM	YES	NO	REMARKS
1	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Longitudinal Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Transverse Cracks	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Settlement/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Slumps/Sloughs	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

6	Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Adequate Vegetation Cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Even vegetation mowed at base
8	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	29 observed gopher holes and one large badger hole
10	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11	Other	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

## 2. Abutment and Toe

### A. Downstream Toe

#	ITEM	YES	NO	REMARKS
1	Seepage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standing water below outlet structure, no seepage observed along remainder of toe
2	Depressions/Bulges	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Boils	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Toe Drain in Good Condition	<input type="checkbox"/>	<input type="checkbox"/>	Not able to observe toe drain, appears to discharge into channel below primary spillway
5	Toe Drain Flowing	<input type="checkbox"/>	<input type="checkbox"/>	Phase 1 inspection 1980, "The toe drainage extends along the length of the embankment and discharges into the stilling basin (Plate 3). The dam is composed of a sand-gravel mixture, and is shown to be 3 feet deep and 5 feet wide on the design cross-section Although the material did not meet specifications, it appears to function adequately. The seepage is collected adjacent to the spillway outlet and piped into the stilling basin At the time of our investigation there was a trickle of water flowing from the outlet."
6	Relief Wells Flowing	<input type="checkbox"/>	<input type="checkbox"/>	N/A
7	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Multiple rodent borings observed
9	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### B. Upstream Abutment

#	ITEM	YES	NO	REMARKS
1	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Slides/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Sinkholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Nuisance Vegetation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Trees observed below the current water line
6	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rodent holes observed
7	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### C. Downstream Abutment

#	ITEM	YES	NO	REMARKS
1	Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor erosion along groin

2	Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Slides/Depressions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Seepage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Drains Flowing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Animal Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Rodent borings observed
8	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Other	<input type="checkbox"/>	<input type="checkbox"/>	

### 3. Primary Spillway and Outlet Structure

Location: Center of Dam

Maximum Discharge: 35 cfs

Visible: Yes

Date Last Inspected: 2016

Type: Drop Inlet

#	ITEM	YES	NO	REMARKS
1	Settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Concrete Cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor cracking of concrete outlet structure
3	Concrete Spalling	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Minor spalling at outlet
4	Concrete Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Exposed Reinforcement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Joint Displacement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Problems with Trash Rack	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Corrosion of Trash Rack	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Erosion Around Intake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
10	Deposition Around Intake	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
11	Other	<input type="checkbox"/>	<input type="checkbox"/>	

#### Downstream Channel

#	ITEM	YES	NO	REMARKS
1	Seepage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Standing water at outlet structure
2	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Riprap Protection Stable	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Deterioration of Riprap	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
5	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Overtopping	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
8	Grade Problems	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
9	Other	<input type="checkbox"/>	<input type="checkbox"/>	

#### Earthen Chute/Downstream channel

#	ITEM	YES	NO	REMARKS
1	Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
2	Obstructions	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
3	Debris	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
4	Deposition of Material	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Wet, marshy, and standing water at outlet

5	Nuisance Vegetation	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
6	Animal Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
7	Other	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locked Vehicle Access Gate

Report completed by: Brad Koon, Triple Tree Engineering

RECOMMENDATIONS		
Maintenance/Repair		
ID	Description	Status
1:C:9	Provide Rodent Control	
1:B:11	Grease and cap at structure	
2.A.5	Ensure Toe Drain Outlet is Unobstructed	
Multiple	Monitor Noted Erosion Areas	
Annual Maintenance		
ID	Description	Status
3.A.11	Lubricate and Operate Spillway Gate	
2.B.1	Monitor Water Levels Below Outlet Structure	

## APPENDIX B

### PHOTO LOG





Sullivan Dam  
Crest

PHOTO 1



Badger Hole on  
Sullivan Dam  
Crest

PHOTO 2



Rodent Hole on  
Sullivan Dam  
Crest

PHOTO 3



Sullivan Dam  
Crest

PHOTO 4





Sullivan Dam  
Outlet Structure

PHOTO 5



Sullivan Dam  
Upstream Slope  
Protection

PHOTO 6



Sullivan Dam  
Upstream Slope

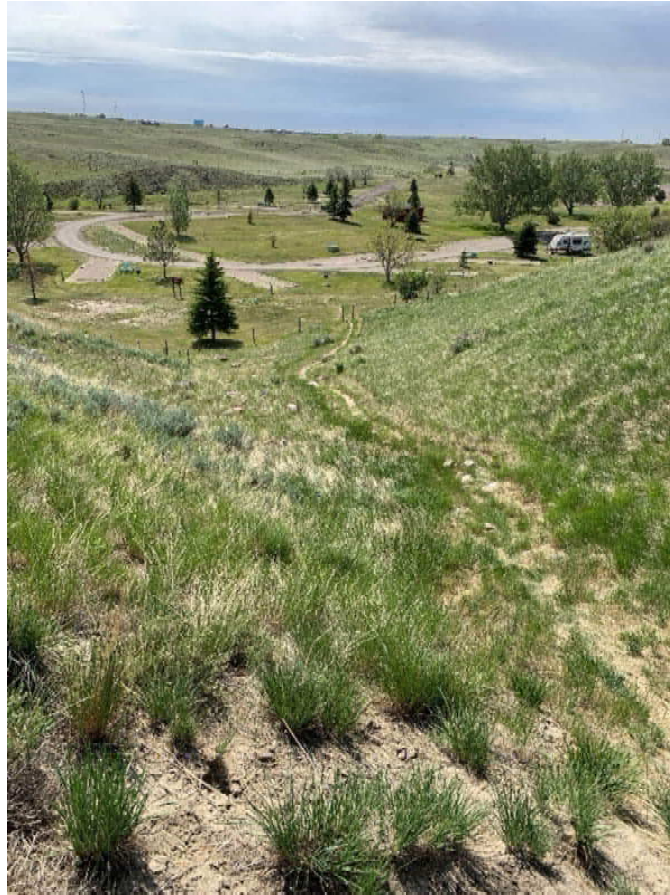
PHOTO 7



Sullivan Dam  
Upstream Slope

PHOTO 8





Sullivan Dam  
Downstream West  
Groin

PHOTO 9



Sullivan Dam  
Downstream Slope

PHOTO 10



Sullivan Dam  
Downstream West  
Groin

PHOTO 11



Sullivan Dam  
Downstream Toe

PHOTO 12





Sullivan Dam  
Primary Spillway  
Outlet Structure

PHOTO 13



Sullivan Dam  
Downstream Slope

PHOTO 14





Sullivan Dam  
Downstream Slope  
and Outlet  
Channel

PHOTO 15



Sullivan Dam  
Downstream Slope  
and Outlet  
Channel

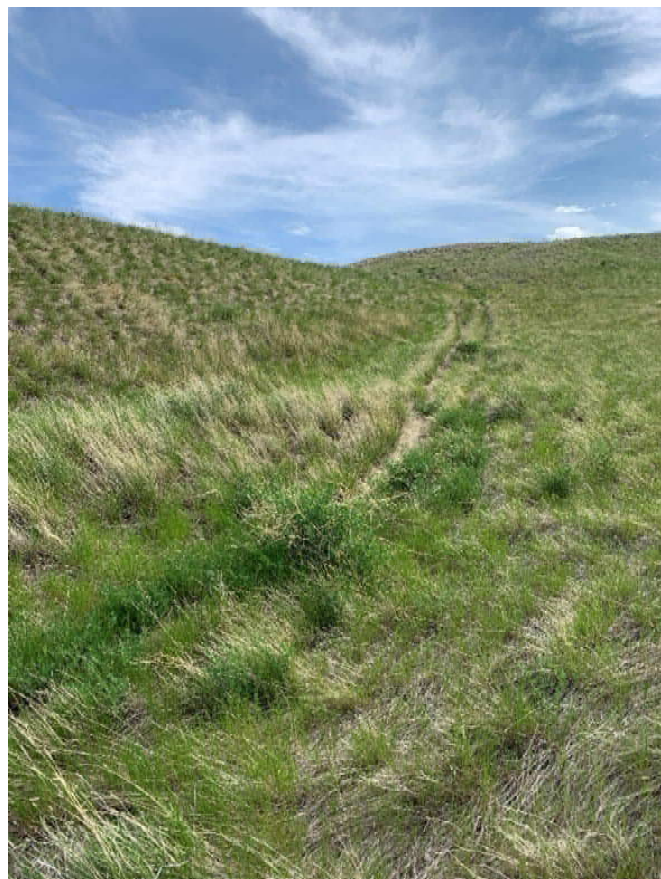
PHOTO 16





Sullivan Dam  
Primary Spillway  
Rodent Hole  
Above Outlet  
Structure

PHOTO 17



Sullivan Dam  
Downstream East  
Groin

PHOTO 18



Sullivan Dam  
Downstream Slope

PHOTO 19



Sullivan Dam  
Downstream Slope

PHOTO 20





Sullivan Dam  
Upstream East  
Groin

PHOTO 21



Sullivan Dam  
Upstream Slope

PHOTO 22



Sullivan Dam  
Crest

PHOTO 23



Sullivan Dam  
Downstream Slope

PHOTO 24





Sullivan Dam  
Primary Spillway  
Vent

PHOTO 25



Sullivan Dam

PHOTO 26



Sullivan Reservoir

PHOTO 27



Cowpath Dam  
North

PHOTO 28





Cowpath Dam  
North

PHOTO 29



Cowpath Dam  
North Upstream  
Slope

PHOTO 30



Cowpath Dam  
North Upstream  
Slope

PHOTO 31



Cowpath Dam  
South

PHOTO 32





Cowpath Dam  
South Upstream  
Slope and  
Reservoir

PHOTO 33



Cowpath Dam  
South Upstream  
Slope

PHOTO 34





Cowpath Dam  
South Rodent  
Channel

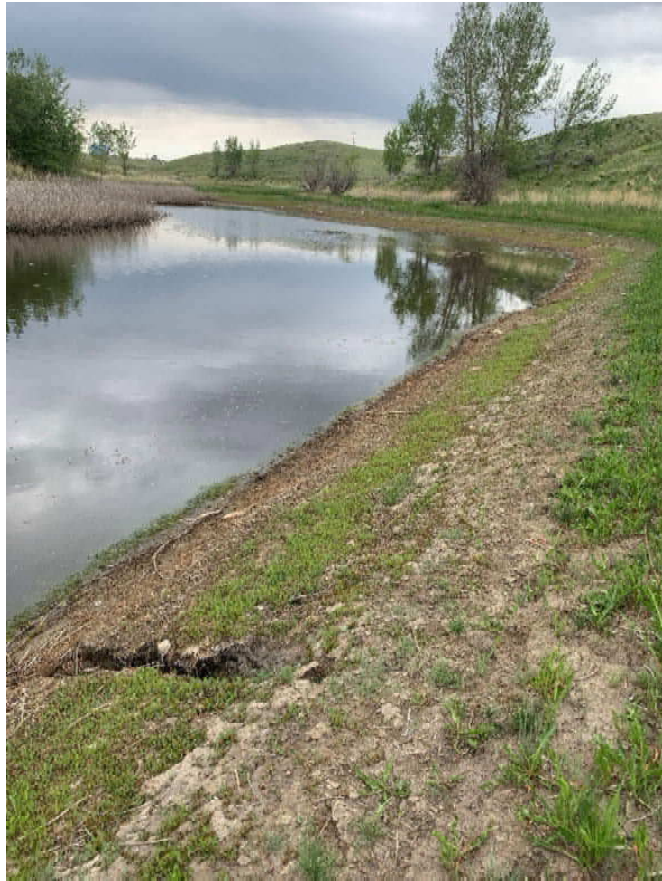
PHOTO 35



Cowpath Dam  
South Rodent  
Channel

PHOTO 36





Cowpath Dam  
South Reservoir

PHOTO 37



Cowpath Dam  
South Rodent  
Channel and  
Boring

PHOTO 38



Cowpath Dam  
South Reservoir  
and Upstream  
Slope

PHOTO 39



Cowpath Dam  
South Reservoir

PHOTO 40





Cowpath Dam  
South Upstream  
Slope

PHOTO 41



Cowpath Dam  
South Upstream  
Slope

PHOTO 42





Cowpath Dam  
South Underdrain  
Outlet

PHOTO 43



Cowpath Dam

PHOTO 43





Cowpath Dam  
North  
Downstream  
Groin

PHOTO 44



Cowpath Dam  
North  
Downstream Slope

PHOTO 45



Cowpath Dam  
Crest

PHOTO 46



Cowpath Dam  
North Tree at Toe  
of Upstream Slope

PHOTO 47





Cowpath Dam  
North Reservoir  
Area

PHOTO 48



Cowpath Dam  
North Upstream  
Slope and  
Reservoir Area

PHOTO 49



Cowpath Dam  
Crest

PHOTO 50



Cowpath Dam  
Excavated  
Channel  
Connecting North  
and South  
Reservoir Area

PHOTO 51





Cowpath Dam  
North Toe Drain  
Outlet

PHOTO 52



Cowpath Dam  
North Toe Drain  
Outlet

PHOTO 53