

# Recreational River Access Webster City, IA

ZDA Consultants



# Meet our Team



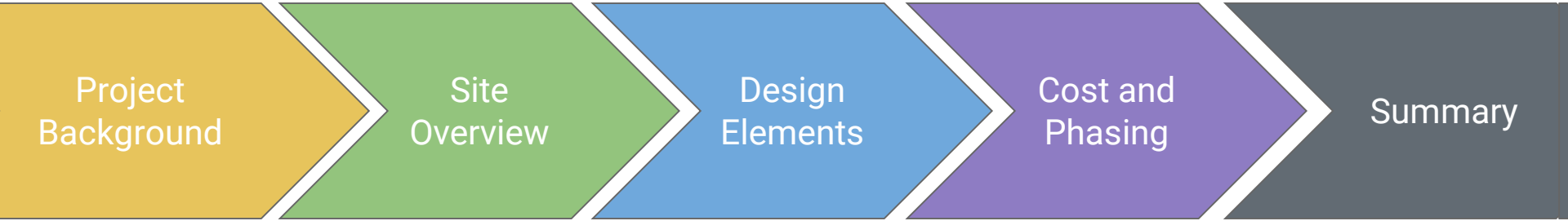
Zach Heisterkamp  
Project Manager



Aaron Gehrke  
Editor



David Braun  
Technical Services



Project  
Background

Site  
Overview

Design  
Elements

Cost and  
Phasing

Summary

Project

Background

Goals of the project are to:

1. Create more river recreation accessibility
2. Provide safe navigation around/over the low-head dam
3. Reduce trash along river

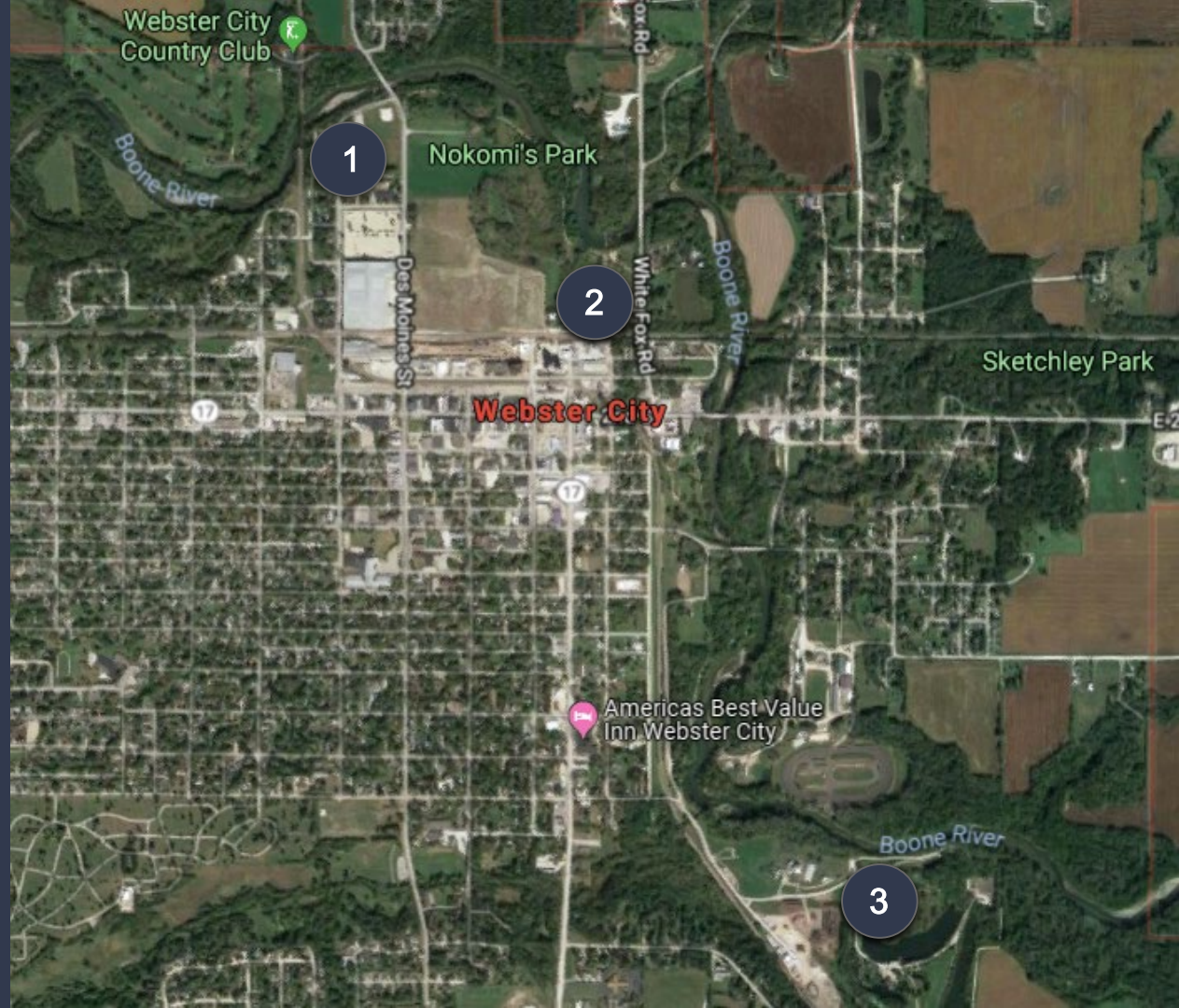


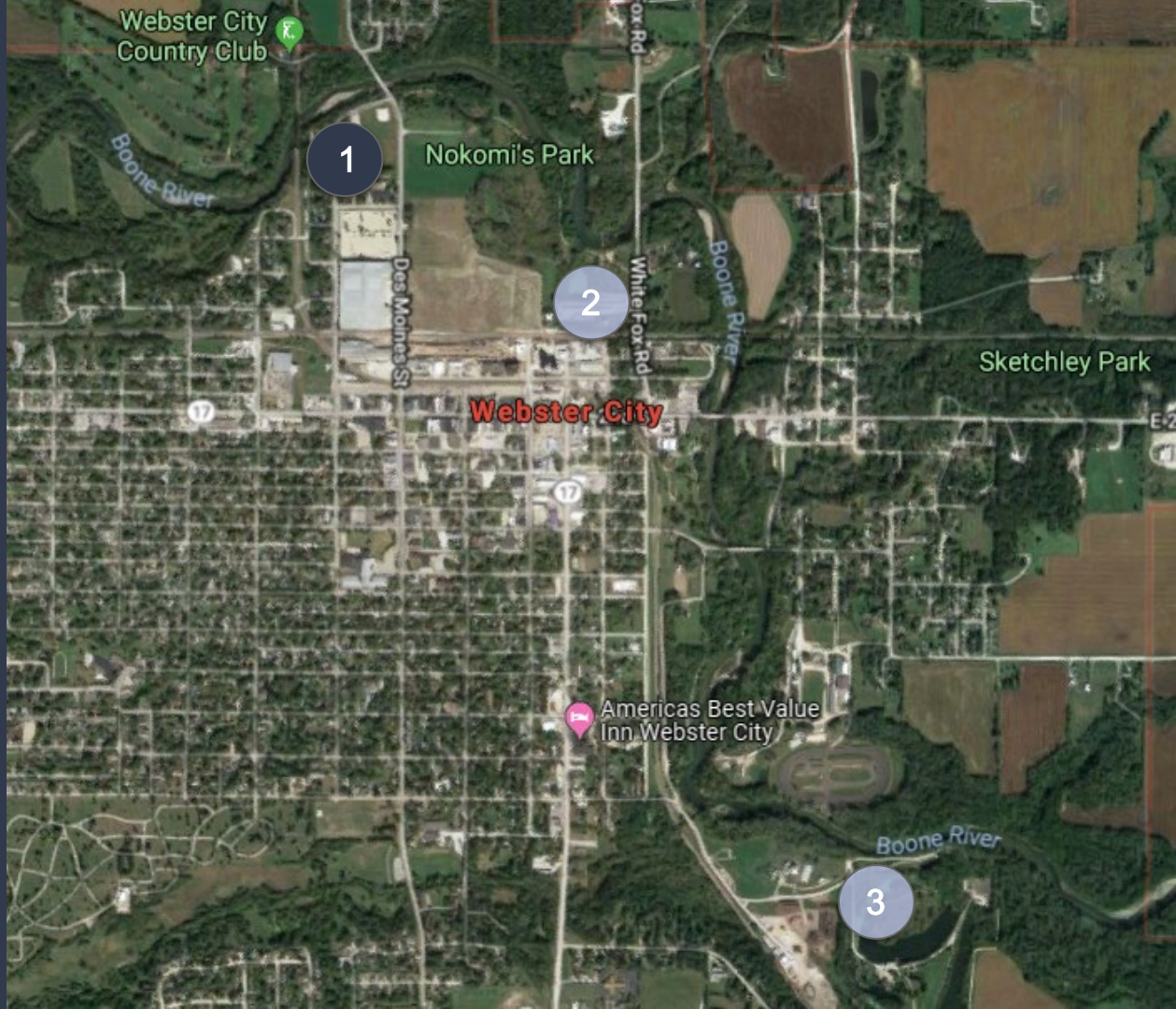
Site

Overview



# Project Site Overview





Webster City  
Country Club

1

Nokomi's Park

2

Webster City

Sketchley Park

Americas Best Value  
Inn Webster City

3

Boone River

Boone River

Boone River

Des Moines St

White Fox Rd

17

17

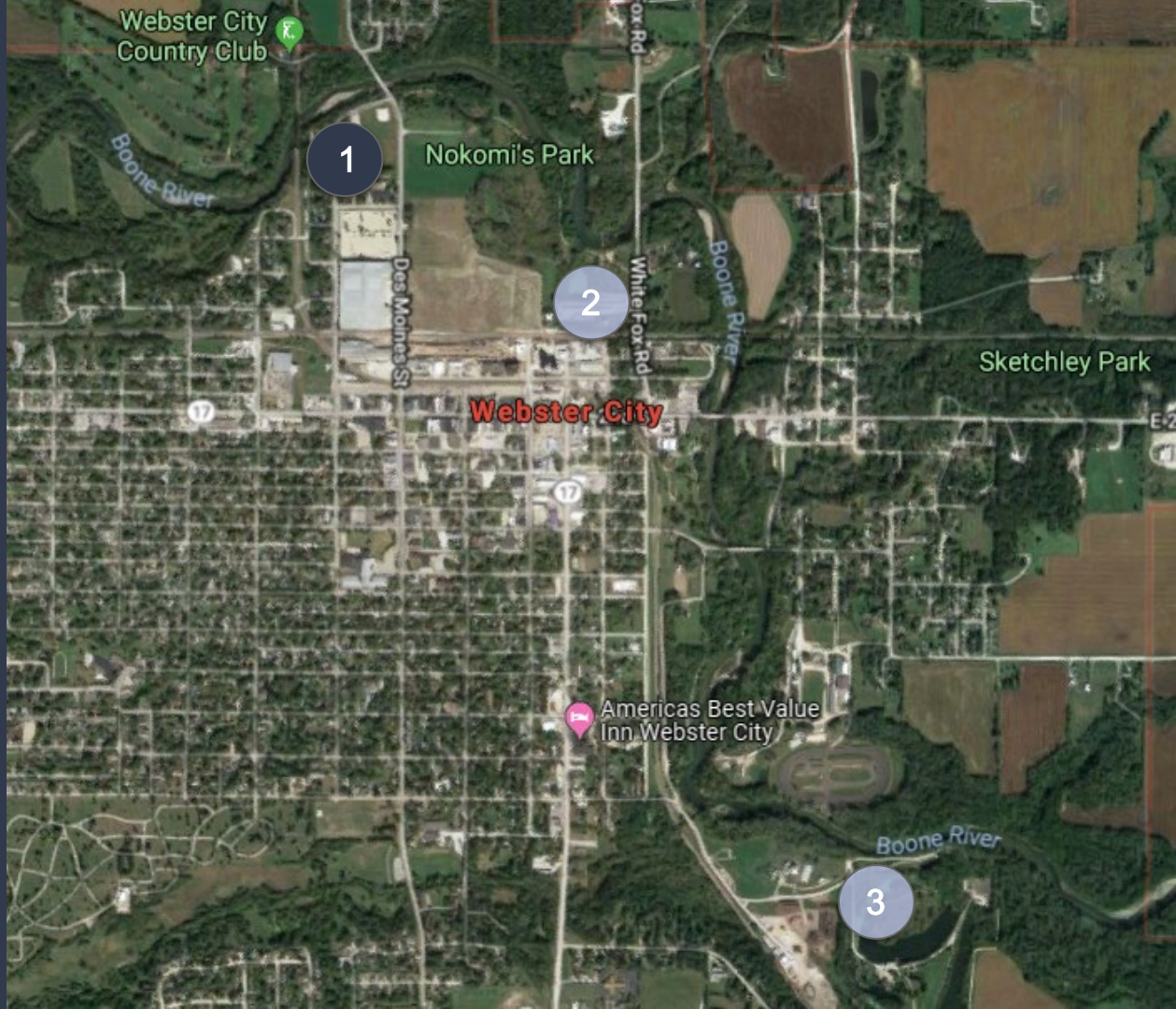
E-2

17



# Site 1: Nokomis Park Access





Webster City  
Country Club

1

Nokomi's Park

2

Webster City

Americas Best Value  
Inn Webster City

3

Sketchley Park

Boone River

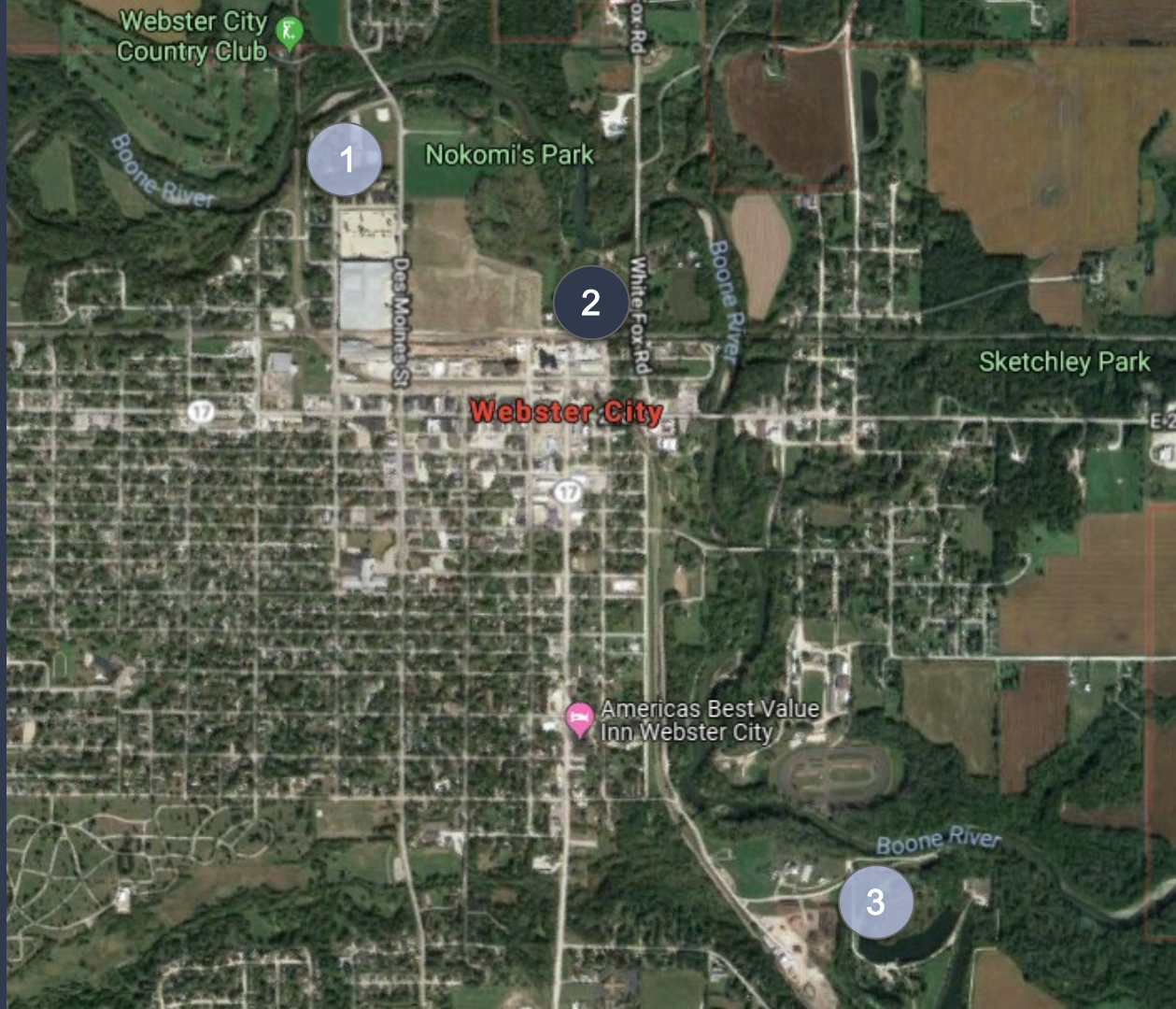
Boone River

Boone River

Des Moines St

White Fox Rd





Webster City  
Country Club

1

Nokomi's Park

2

Sketchley Park

**Webster City**

Americas Best Value  
Inn Webster City

3

Boone River

Boone River

Boone River

Des Moines St

White Fox Rd

17

17

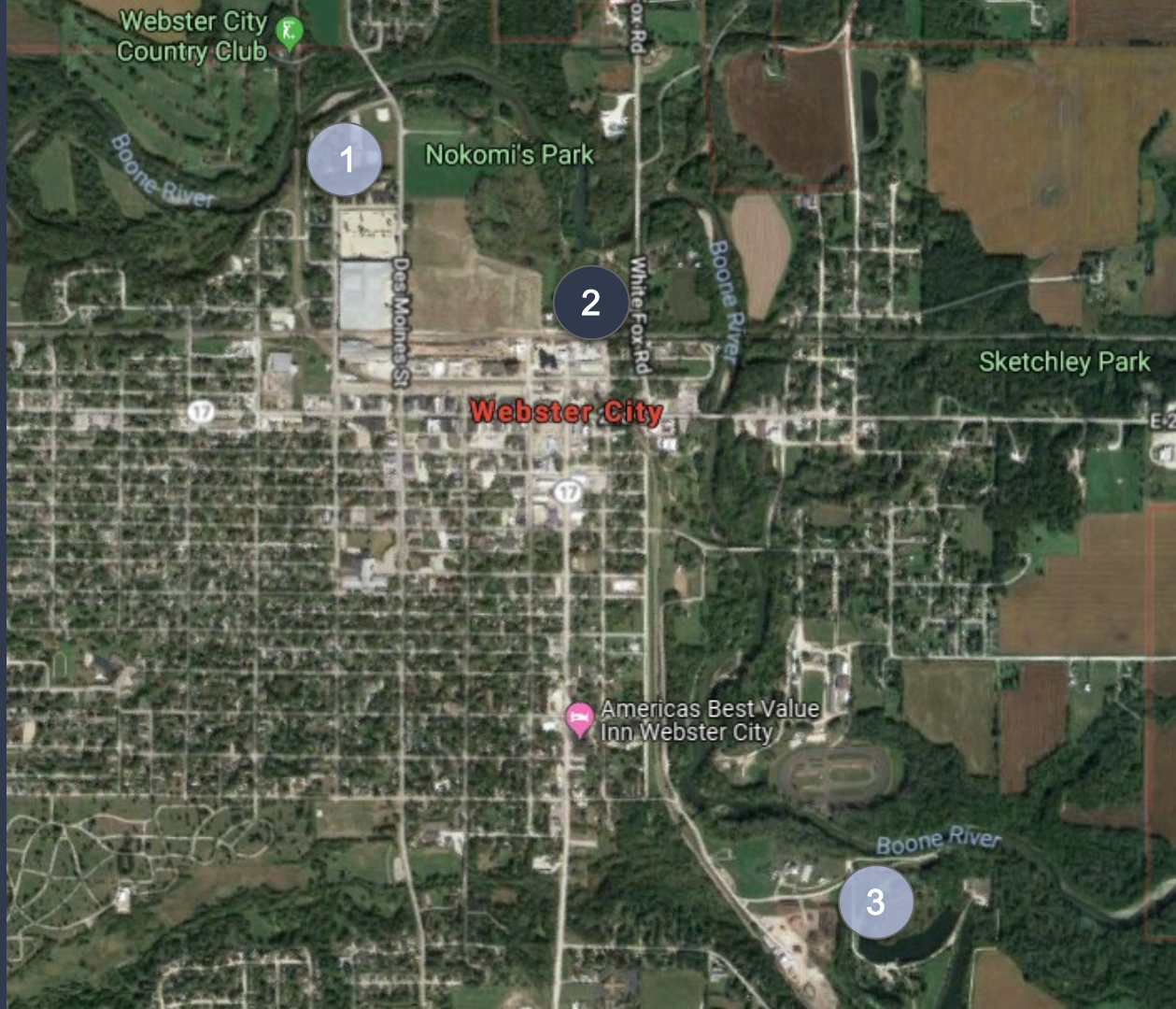
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17

# Site 2: Water Works Park Access







Webster City  
Country Club

1

Nokomi's Park

2

Webster City

Sketchley Park

Americas Best Value  
Inn Webster City

3

Boone River

Boone River

Boone River

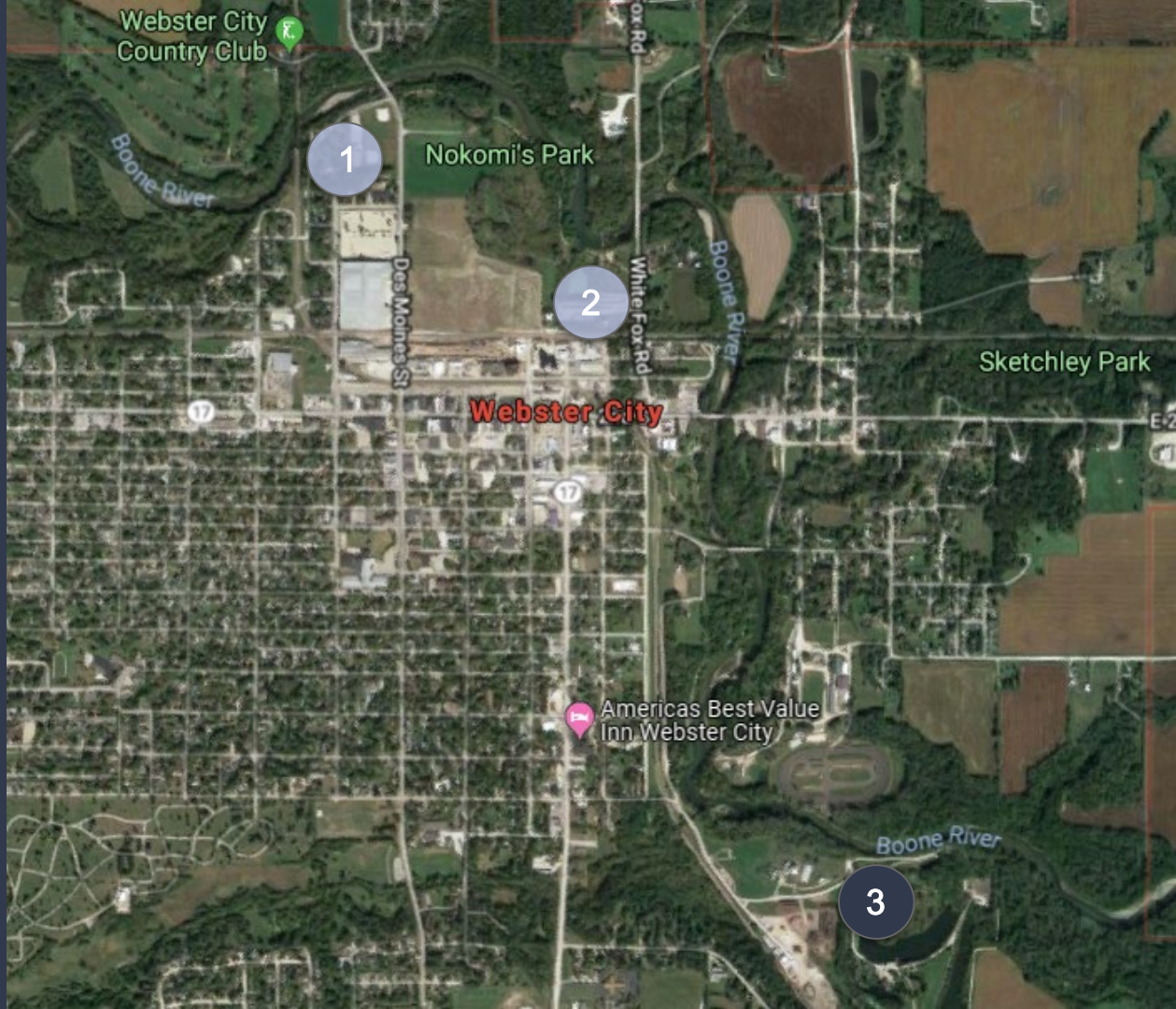
Des Moines St

White Fox Rd

17

17

E-2



Webster City  
Country Club

1

Nokomi's Park

2

Webster City

Sketchley Park

Americas Best Value  
Inn Webster City

3

Boone River

Boone River

Boone River

Des Moines St

White Fox Rd

17

17

E-2



# Site 3: 7B Ranch Access



Design

Elements



# Elements to Aid Scope of Work

- USGS Stream Gage Data
- HEC-RAS
- Iowa DNR Stormwater Manual
- Iowa DNR Water Trails Guide
- Iowa Stream Restoration Toolbox
- SUDAS Design Manual

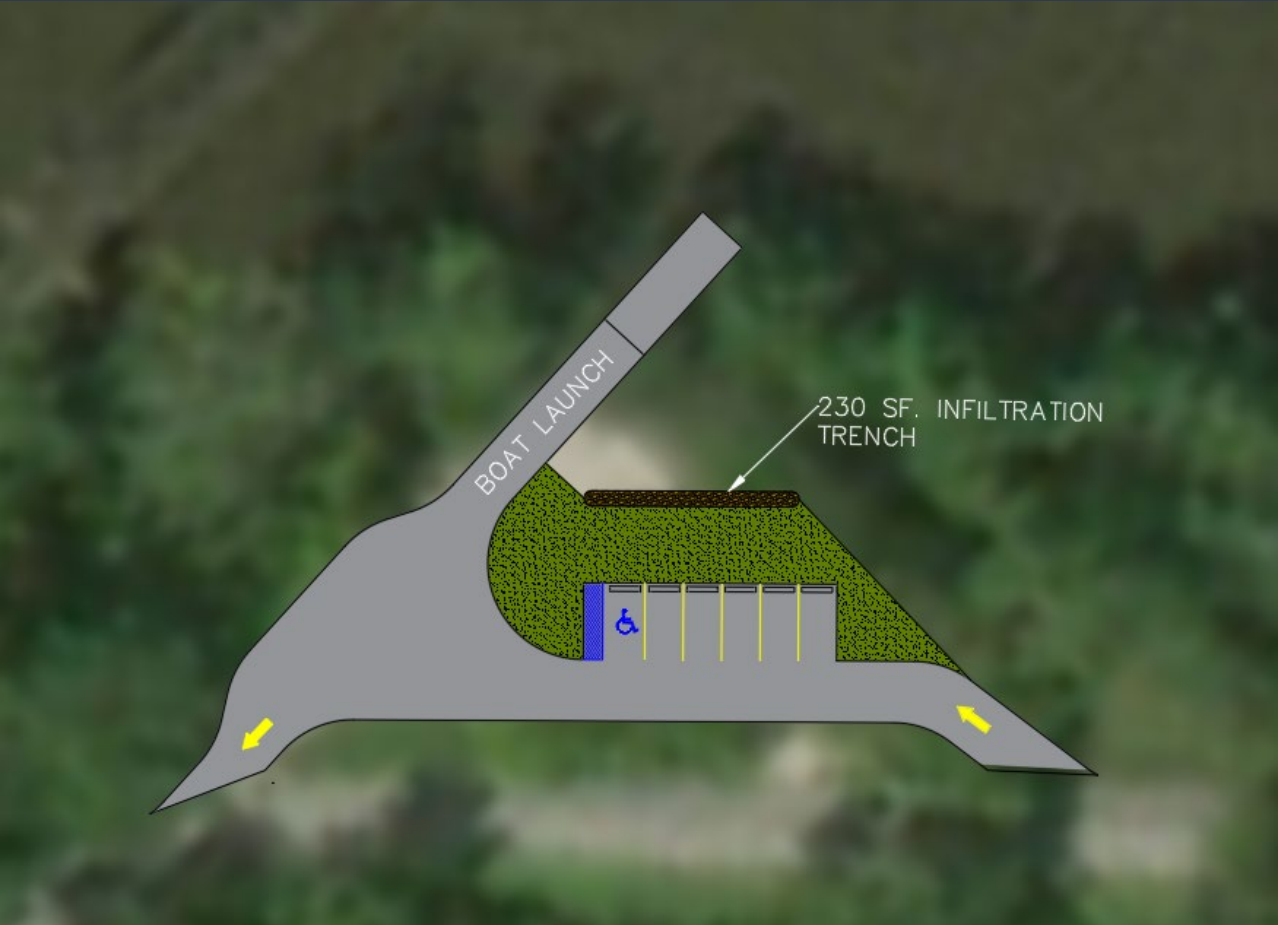


# Nokomis Park Design



ACCESS  
# 29  
→

**Warning**  
Dam Ahead  
1 Mile  
Last Landing  
Portage Ahead  
Right Bank



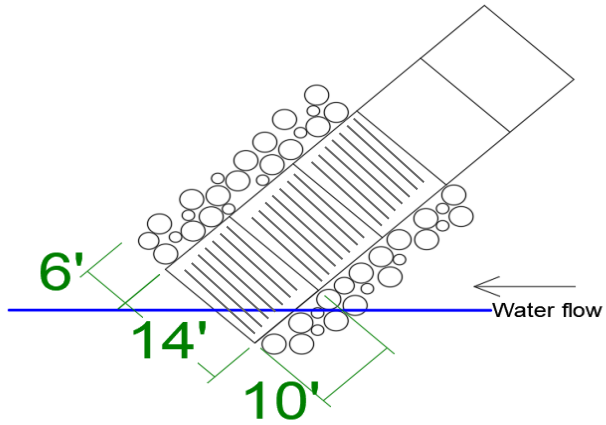
Webster City  
Boone River Country  
**Boone River  
Recreational  
Trail**

Access 29  
0.7 miles to  
Access 28

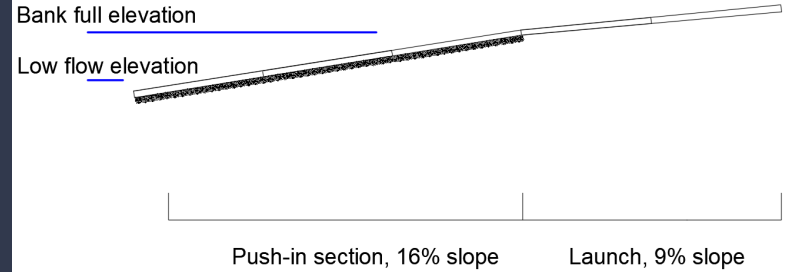
**Water Trail Rules**  
Respect Private Property.  
Much land along this waterway is private. Do not tamper with fences, livestock, or any other property. Enter private land only with permission of the landowner.  
**Be Safe.**  
River users are required to have a Personal Flotation Device in the boat. Actually wearing it greatly increases your chance of survival if you capsize. River flows change and conditions change constantly. Avoid hazards such as snags, and ALWAYS portage at low-head dams.  
**Limit Alcohol Consumption.**  
Intoxication on waterways leads to poor judgement and increased risk of drowning.  
**No Littering or Dumping.**  
Leave no trace. Volunteers work to keep this river clean.

# Nokomis Ramp Design

Plan View



Cross Section



# Water Works Park Site Plan



**ACCESS**  
# 28  
→

**Warning**  
Dam Ahead  
Move Right  
For Portage

**Danger**  
Dam Ahead  
Last Safe  
Portage Here  
Exit Now! →

←  
Portage Trail



Access 28  
0.9 miles to  
Access 27

**Water Trail Rules**

**Respect Private Property.**  
Much land along this waterway is private. Do not tamper with fences, livestock, or any other property. Enter private land only with permission of the landowner.

**Be Safe.**  
River users are required to have a Personal Floatation Device in the boat. Actually wearing it greatly increases your chance of survival if you capsize. River flows change and conditions change constantly. Avoid hazards such as snags, and ALWAYS portage at low-head dams.

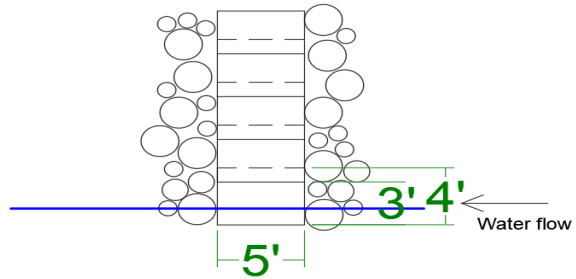
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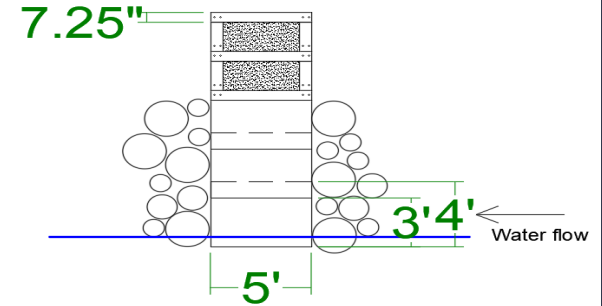


# Water Works Park Ramp Designs

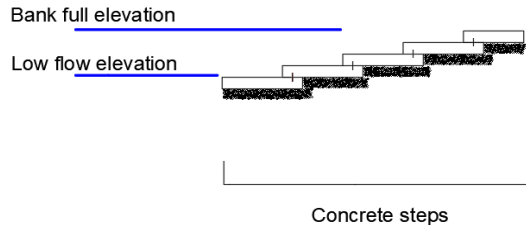
Plan View



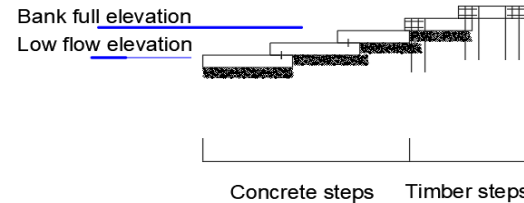
Plan View



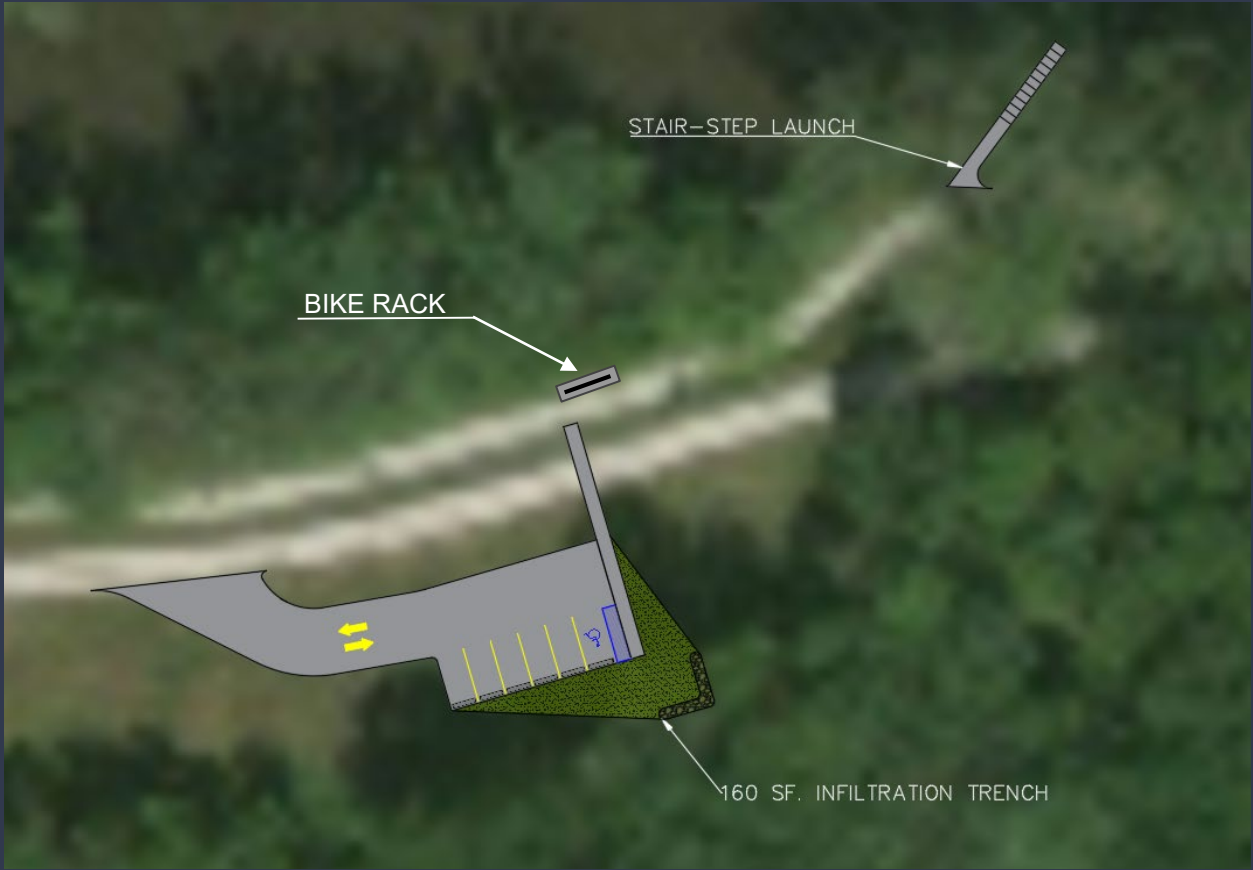
Cross Section



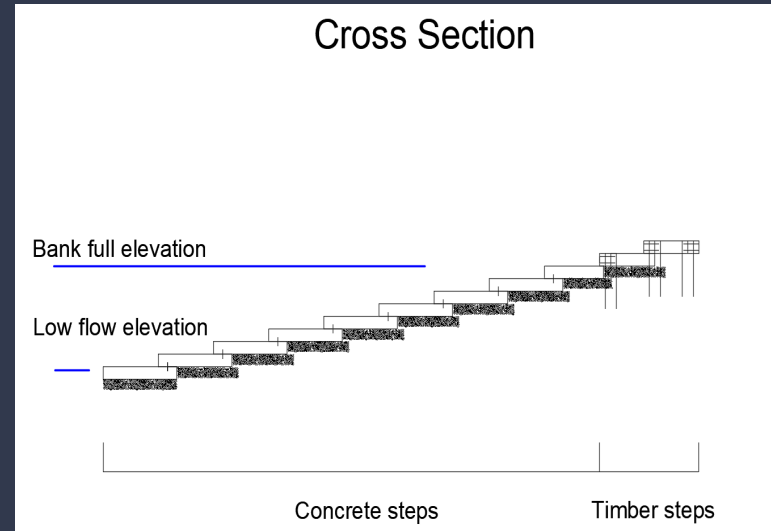
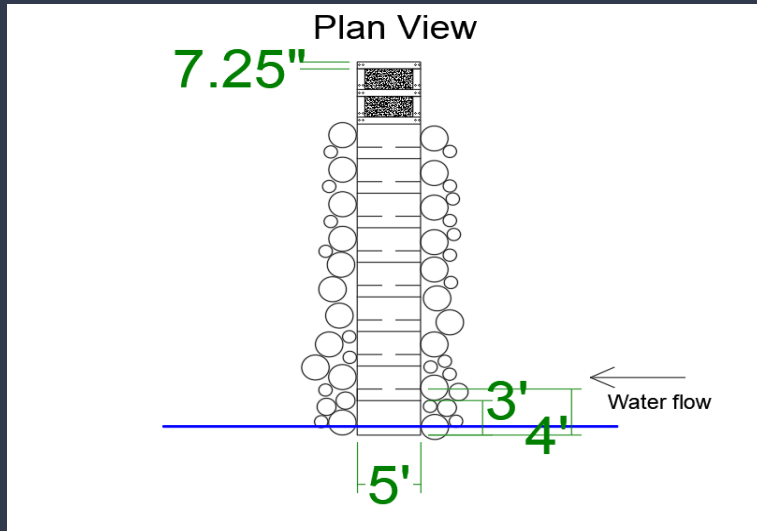
Cross Section



# 7B Ranch Site Plan



# 7B Ranch Ramp Designs



# Water Quality

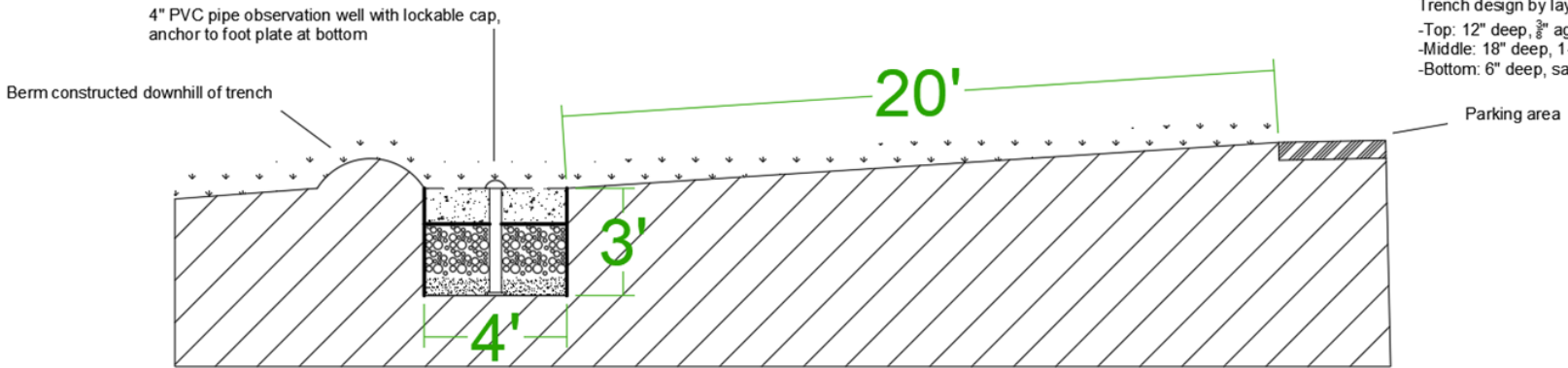
Nokomis Park	
Parking Area (ft <sup>2</sup> )	7216
Storm Event (in)	1.25
Runoff Coeff.	0.95
Storage Needed (ft <sup>3</sup> )	714
Trench Depth (ft)	3
Agg. Void Space	0.35
Infiltration Rate (in/hr)	0.5
Drainage Time (hr)	48
Trench Surface Area (ft <sup>2</sup> )	230

Water Works Park	
Parking Area (ft <sup>2</sup> )	11285
Storm Event (in)	1.25
Runoff Coeff.	0.95
Storage Needed (ft <sup>3</sup> )	1117
Trench Depth (ft)	3
Agg. Void Space	0.35
Infiltration Rate (in/hr)	0.5
Drainage Time (hr)	48
Trench Surface Area (ft <sup>2</sup> )	360

7B Ranch	
Parking Area (ft <sup>2</sup> )	4902
Storm Event (in)	1.25
Runoff Coeff.	0.95
Storage Needed (ft <sup>3</sup> )	485
Trench Depth (ft)	3
Agg. Void Space	0.35
Infiltration Rate (in/hr)	0.5
Drainage Time (hr)	48
Trench Surface Area (ft <sup>2</sup> )	160

# Infiltration Trench Designs

## Cross Section



- Notes:
- Line the sides of trench with filter fabric
  - Filter fabric between top and middle layer of aggregate
- Trench design by layer:
- Top: 12" deep, 3/8" aggregate
  - Middle: 18" deep, 1-3" aggregate
  - Bottom: 6" deep, sand

Parking area



# Prairie Plants



Blue Lobelia


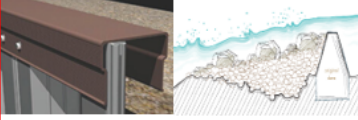
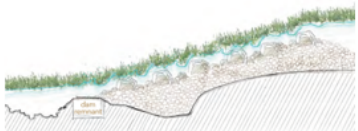
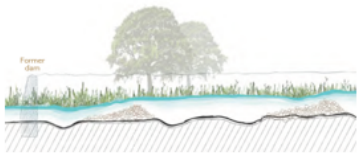


Goldenrod Cultivators



Butterfly Milkweed

# Four alternatives we considered for dam modifications.

Modification	Environmental Impact	Cost	Recreational Use	Safety	Total
<p>Portage Around Dam</p> 	<p>4</p> <p>The existing dam conditions remain unchanged therefore there is no additional environmental impact</p>	<p>4</p> <p>This is the most cost-effective design alternative</p>	<p>1</p> <p>By forcing users to exit and reenter the river this design option is not the most conducive to recreation</p>	<p>4</p> <p>Public safety is enhanced by eliminating the risk of crossing over the low head dam</p>	<p>13</p>
<p>Capping and Rock Arch Rapids</p> 	<p>4</p> <p>All sediment buildup remains behind the dam and the large rocks downstream provide energy dissipation</p>	<p>3</p> <p>Not making any modifications to the low head dam and just adding rock ramps downstream is the least expensive.</p>	<p>3</p> <p>Maintaining the original height of the dam may make passage over the low head dam difficult for users.</p>	<p>3</p> <p>The sheet metal may still be exposed and offers less clearance over the dam.</p>	<p>13</p>
<p>Height Reduction and Rock Ramps</p> 	<p>2</p> <p>The height of the dam is maintained by the rock arch rapids but there may be some sediment that is transported downstream during construction.</p>	<p>2</p> <p>A significant reduction to the low head dam in addition to rock arch rapids can be costly.</p>	<p>3</p> <p>Fairly easy passage, however rock rapids may pose challenge for recreational tubers.</p>	<p>3</p> <p>Some public safety concerns regarding passage through river rapids.</p>	<p>10</p>
<p>Complete Dam Removal and Restoration</p> 	<p>1</p> <p>By completely removing the dam it is likely that all the sediment built up behind it will be transported downstream. Higher river velocities may also be experienced.</p>	<p>1</p> <p>Completely removing the dam is the most costly.</p>	<p>4</p> <p>With a more natural river profile it is easy to achieve smooth passage.</p>	<p>4</p> <p>Without having to cross over any low head dam or rock rapids ensures the greatest public safety.</p>	<p>10</p>

# Selected Dam Modifications



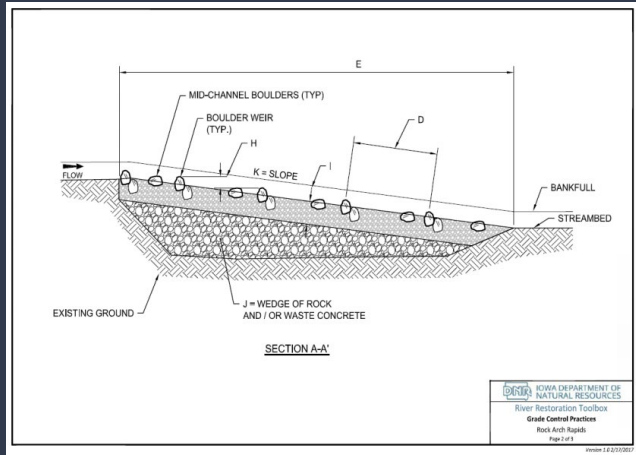
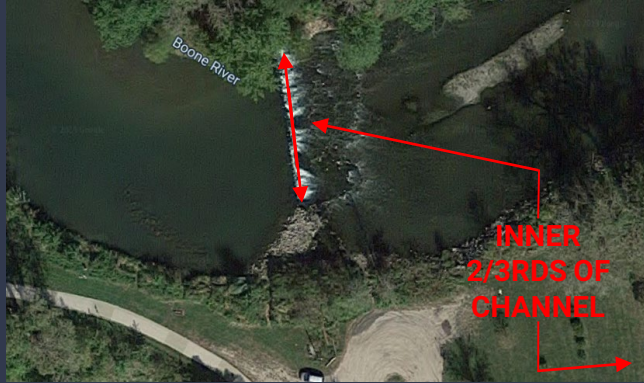
Steel Capping of Sheet Pile



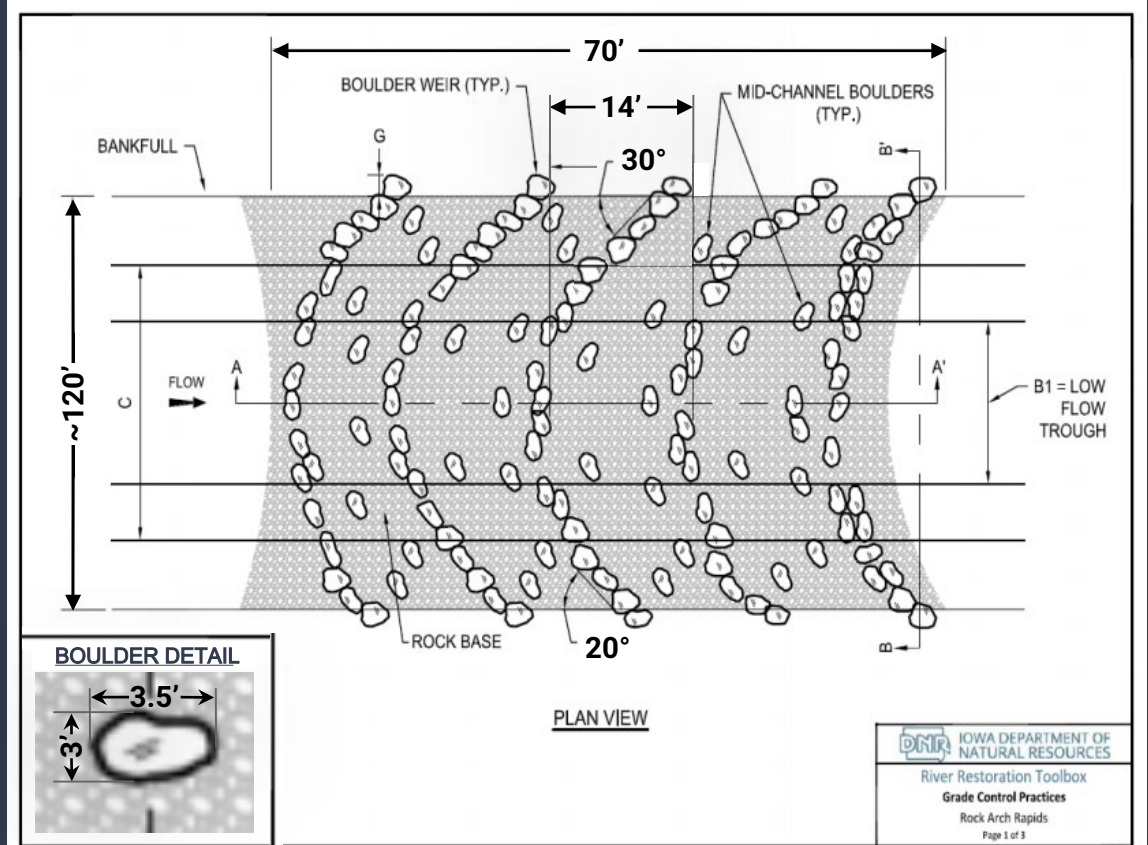
Downstream Rock Arch Rapids



# Rock Arch Rapids Design



IOWA DEPARTMENT OF NATURAL RESOURCES  
 River Restoration Toolbox  
 Grade Control Practices  
 Rock Arch Rapids  
 Page 1 of 3  
 version 1.0 2/17/2017





# Amenities



# Cost and Phasing

# Recommended Phasing

Nokomis Park Site



Portage at Water Works



Dam Capping & Water Works Site



7B Ranch Site

# Sample Cost Estimate

MATERIAL	TYPE	UNIT	QUANTITY	UNIT PRICE	COST
Cut	Earthwork	CY	670.95	\$1.44	\$964.49
Fill	Earthwork	CY	52.69	\$38.40	\$2,023.30
Concrete	Paving	SY	697.94	\$200.00	\$139,587.63
Pavement Markings	Paving	LF	300.00	\$0.23	\$69.00
4" PVC Pipe	Pipe	LF	3	\$50.00	\$150.00
3/8" Aggregate	Aggregate	Ton	23.05	\$28.50	\$656.84
1-3" Aggregate	Aggregate	Ton	40.00	\$35.00	\$1,400.00
Medium Aggregate Sand	Aggregate	CY	6.67	\$29.50	\$196.67
Class A Granular Subbase	Aggregate	Ton	7.28	\$21.00	\$152.88
Class D Rip Rap	Aggregate	Ton	10.56	\$34.19	\$361.05
Timber	Steps	MBF	0.03	\$2,650.00	\$79.50
10" Timber Screws	Support	Ea.	12	\$4.50	\$54.00
1/2" Rebar (32" long)	Support	Ea.	15	\$1.10	\$16.50
Stabilization Fabric	Landscape	SY	80.00	\$0.86	\$68.80
Landscape Filter Fabric (18" x 180'	Landscape	Ea.	2.11	\$58.50	\$123.72
Tree Removal	Landscape	Ea.	15	\$450.00	\$6,750.00
Shrub Removal	Landscape	ac	0.16	\$1,386.00	\$221.76
Vegetative Seeds	Landscape	ac.	0.07	\$150.00	\$10.35
Accessible Parking Sign and Post	Signage	Ea.	2	\$276.00	\$552.00
Water Trail Signs	Signage	Ea.	6	\$200.00	\$1,200.00
Solar Compacting Bins (Dual Unit)	Misc.	Ea.	1	\$7,000.00	\$7,000.00
Wooden Park Bench	Misc.	Ea.	1	\$500.00	\$500.00
<b>SUBTOTAL</b>					<b>\$162,138</b>
15% Contingency					\$24,321
<b>TOTAL PROJECT COST</b>					<b>\$186,459</b>

Water Works Park

MATERIAL	TYPE	UNIT	QUANTITY	UNIT PRICE	COST
C15" x 33.9" Beam	Capping	LF	122	\$55.00	\$6,710.00
1/2" Steel Bolts (6" long)	Support	Ea.	19	\$5.02	\$95.38
3/8" Aggregate	Aggregate	Ton	709.80	\$28.50	\$20,229.30
Random Broken Stone	Aggregate	SY	40.00	\$100.90	\$4,036.00
Class A Granular Subbase	Aggregate	Ton	1.00	\$21.00	\$20.90
Field Stone Bolders	Aggregate	Ton	55	\$300.00	\$16,500.00
Landscape Filter Fabric (18" x 180' ro	Landscape	Ea.	28	\$58.50	\$1,638.00
<b>SUBTOTAL</b>					<b>\$49,230</b>
15% Contingency					\$7,384
<b>TOTAL PROJECT COST</b>					<b>\$56,614</b>

Capping & Rock Rapids



# Total Project Cost Estimate

<b>NOKOMIS PARK</b>	
SUBTOTAL	\$ 83,900
+ 15% Contingency	\$ 96,000
<b>WATER WORKS PARK</b>	
SUBTOTAL	\$ 162,000
+ 15% Contingency	\$ 186,300
<b>DAM &amp; ROCK RAPIDS</b>	
SUBTOTAL	\$ 49,000
+ 15% Contingency	\$ 56,000
<b>7B RANCH</b>	
SUBTOTAL	\$ 62,000
+ 15% Contingency	\$ 71,000
<b>TOTAL PROJECT COST</b>	<b>\$ 409,300</b>

# Summary



Questions?